SPECIAL FOCUS: TOOLS & STUDIO

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JULY 2012

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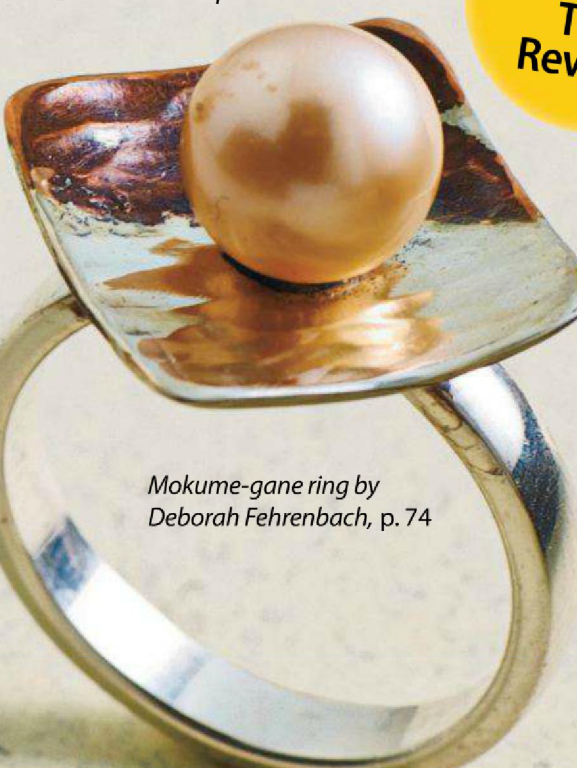

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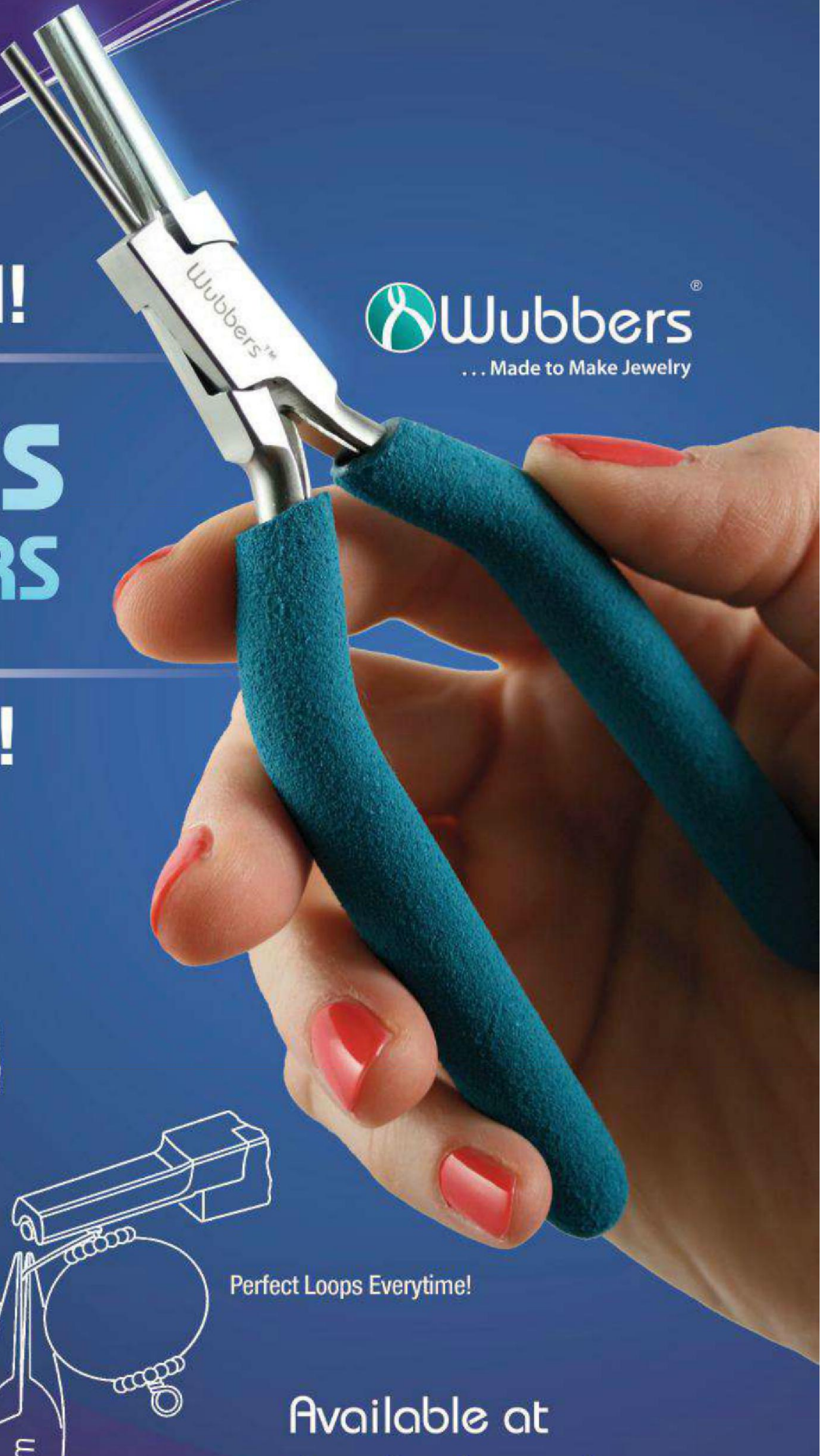

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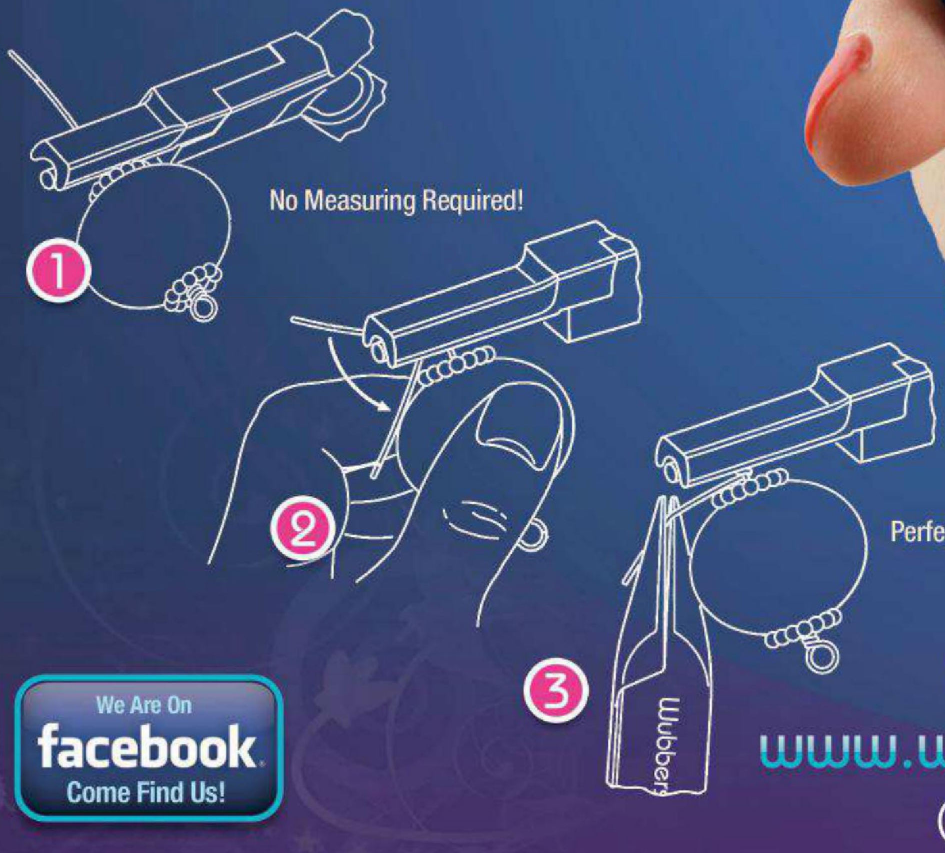
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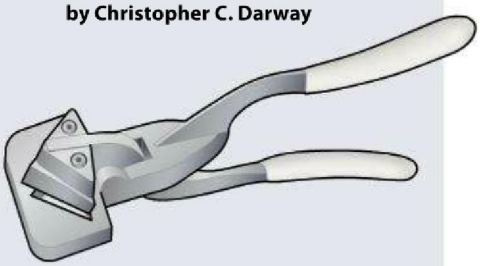

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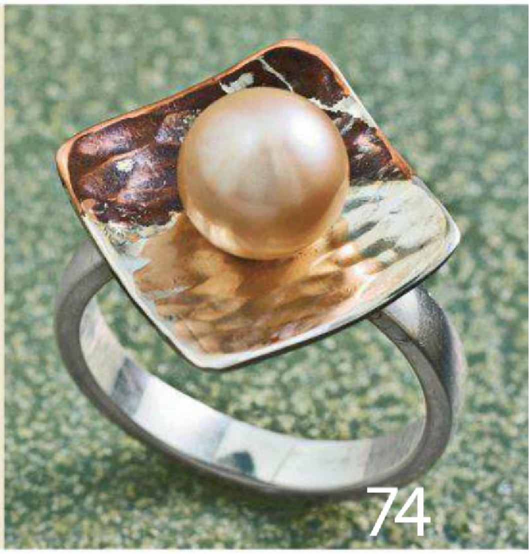

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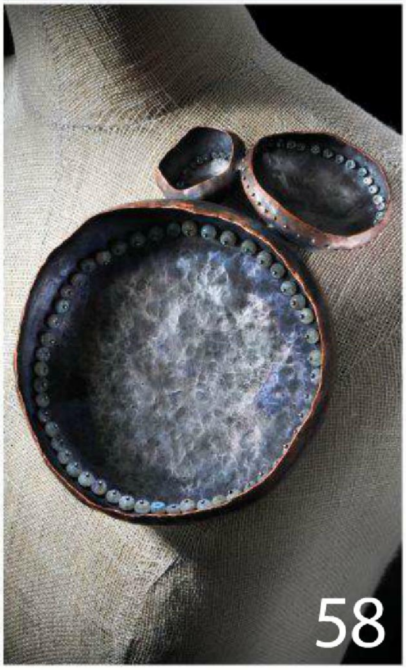

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Tools & the studio

In my years of working with jewelry makers, I've learned that nothing motivates you like tools do. Whether you're a traditionalist who believes in keeping a small, core set of finely crafted hand tools, or a new-tech devotee who's excited about the newest innovation, whenever I ask about your tools, I get an immediate and enthusiastic response. So in this issue, we're celebrating tools and the studios where you work with them.

We deal with tools in every issue of *Art Jewelry*, true. We test and review new tools and products, and we talk about which tool to use with which technique. Andy Cooperman's regular column, Flex Shaft Fundamentals (*page 28*), is dedicated to exploring one tool in depth.

But this issue is different. Tools and studio setup run through the entire issue. In our columns, Richard Shull (Stone Sense, *page 24*) shifted his focus from the stones to the tools you need to have in your toolkit on a stone-buying trip, and Marlene Richey (Business Savvy, *page 34*) turned her attention to steps you can take ensure your home studio is secure.

> We deal with tools in every issue of *Art Jewelry*, true … but this issue is different.

Jill Erickson shared her insights into transforming an empty space into a working metal clay studio (*page 60*), and we asked contributors to this issue to share the best feature of their studio — and of course, to send us photographs (*page 65*). We asked 10 top jewelry makers to name the tools that they wouldn't want to work without (*page 46*). And, in addition to the favorite tools you can buy, there are the tools you can make: Tim McCreight's bench knife (*page 42*), and Brenda Schweder's simple, effective jig (*page 66*). The result is an issue that's brimming with tools and studio material — both hard technical advice and sheer eye candy. Enjoy!

Hazel Wheaton

hwheaton@artjewelrymag.com

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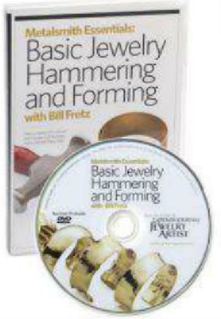
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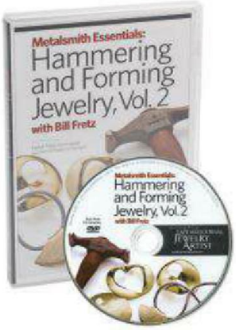
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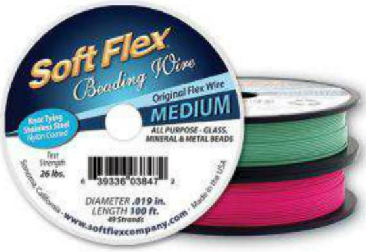
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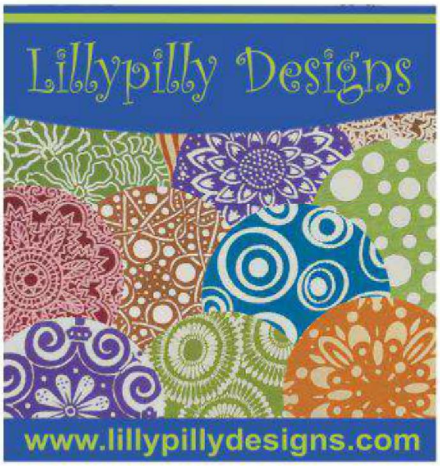

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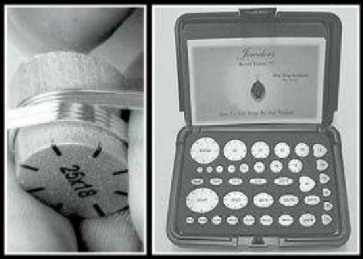

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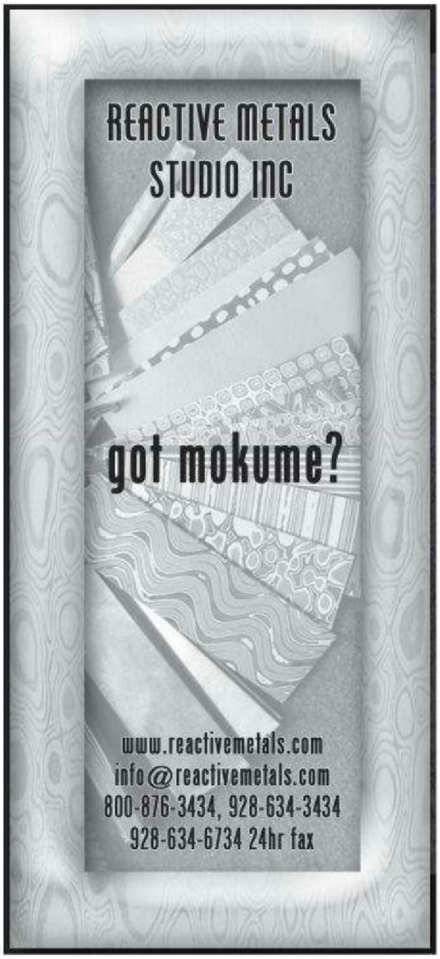

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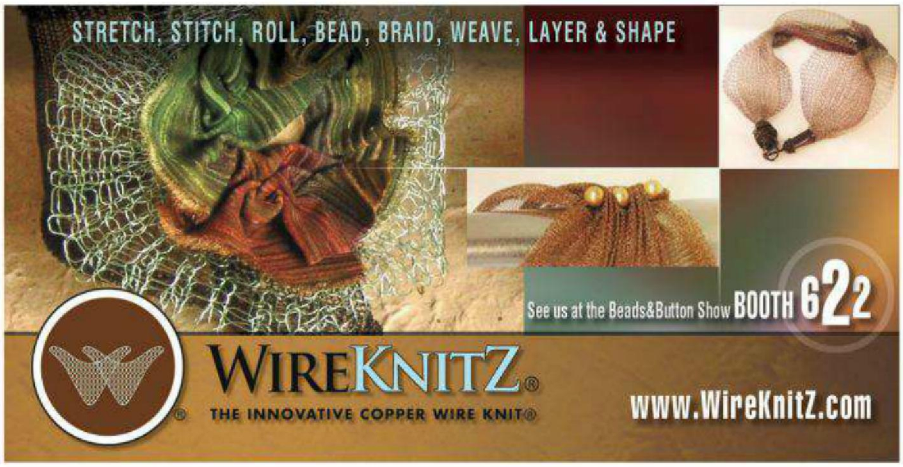

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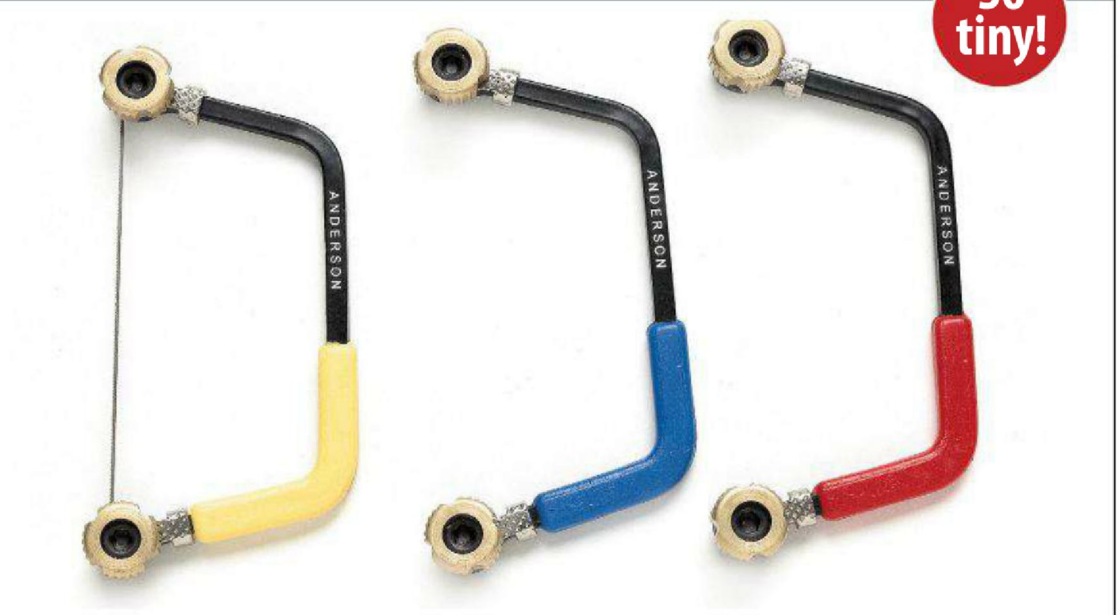

So tiny!

Miniature Saw Frames

While definitely not intended to replace your regular jeweler's saw, these tiny (2⅜ in. [60 mm] length, 1-in. [25.5 mm] throat depth), color-coded saw frames designed by goldsmith Dave Anderson come in handy when you need a delicate touch for corrective cuts in metal and wax. I must admit, when I first saw these saw frames, I was intrigued by their small size, but didn't hold out much hope for them actually working. While they looked adorable, I had my doubts.

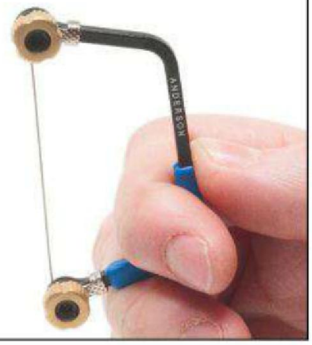
I had to overcome two difficulties when using these saws: keeping the tension on the blade while threading it, and learning how to hold it — but I learned a trick for both.

The instructions say to place a blade between the knurled nuts, and tighten the blade as you would in a regular jeweler's saw. I tried this, but no matter what I did, I could not get the blade to 'ping' and stay taut. I contacted Gesswein, and they suggested I use a small Allen wrench to tighten the nuts. It worked like a charm! Loosen both nuts, place the blade so it rests between the silver plate and the frame, and tighten the top nut with an Allen wrench. Break off the portion of the blade extending from the top of the saw frame. Tighten the bottom nut with the wrench while applying tension on the frame, break off the bit of the blade extending out the bottom of the frame, and you're ready to go.

There's a trick to holding the frame while sawing, too. Instead of grasping the colored part of the frame between your thumb and index finger, place your index finger through the saw frame and pinch the colored, back section of the frame between the first knuckle of your index finger and thumb. Rest your middle finger against the bottom of the frame to stabilize it. I found I had more control with my hand positioned this way, and the grip was similar to a regular saw frame, and therefore more natural.

Although I was initially skeptical about these saw frames, after I got the hang of holding the frame and tightening the blade, I found them quite useful. You will find these saw frames are good for refining seats in prong settings without removing the stone, making relief cuts on prongs that have been partially folded over, refining wax models, making small corrections in pierced metal, and other delicate tasks. The three available colors allow you to have three different size blades ready to go.

— *Annie Pennington*



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READER FORUM

Fresh praise for prongs

I was so inspired and comforted by Joanna Gollberg's article ["Fresh Prongs," July 2011]. I learned to solder years ago, but with four children that I homeschool, I just don't get a lot of time to practice. Prongs were something that I wanted to learn, but figured that it would have to wait until I had time and funds to take a class. This article gave me the courage to forge on ahead and just try it. I'm so glad I did. This ring turned out great!

— Marcy Bell
via email

Patination coming off

I've been oxidizing copper with liver of sulfur and LOS extended life gel. But all of a sudden it seems to be peeling off, and leaving patchy areas. Why this is happening?

— Loveprints
via www.ArtJewelryMag.com

Associate Editor Annie Pennington reponds: *I've definitely had this happen before, and it is quite frustrating! Try making a more diluted liver of sulfur solution. If the LOS solution acts too quickly, it will flake off. Make sure your metal is thoroughly clean, dip it in a warm (not hot) LOS solution, and rinse it in cool water. Repeat dipping and rinsing until you achieve the color you desire. Depending on the piece, I like to scrub my piece with a brass brush after rinsing to help get a more even patina. Be patient. Good luck!*

A letter to Michael David Sturlin

I just sat down with my new *Art Jewelry* magazine and read your *Metalsmithing 101: Teaching 101* piece [March 2012]. A certain phrase you wrote hit home. "Our first attempts are investigative — we are exploring, not conquering."

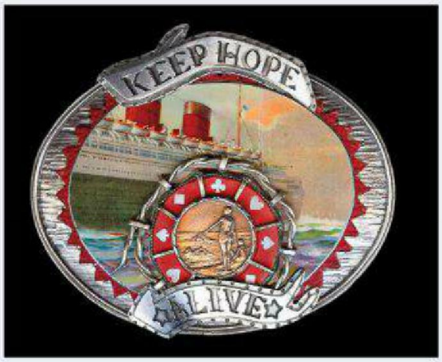
It is perfect for my classroom! So many times, I find students looking through my retail shop at my finished

continued on page 14

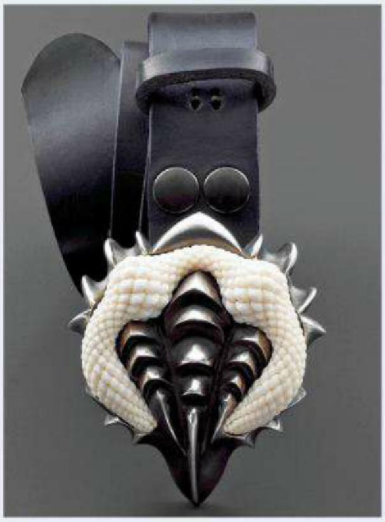
EXHIBIT

Annual World Championship Belt Buckle Competition

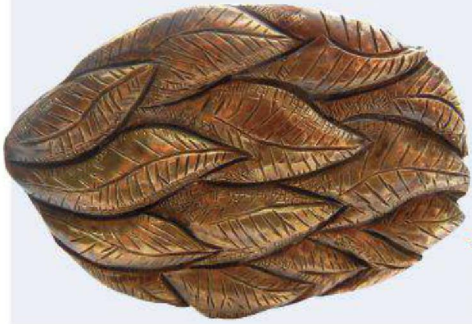
What: The contest was open to the world and encouraged all styles and interpretations of a belt buckle. Entries poured in for a chance to win cash prizes and a world champion title. In first place is Nancy Anderson with her *Keep Hope Alive* buckle. Second place went to Mark Thone's *Chased Buckle*. Rounding out third with their *Stingray Buckle* is Suenos: Arlette Kiefer and Kaspar. Check out the online exhibition to view dozens of finalists. Application details for the 2013 contest are on the website.
When: April 3, 2012–April 3, 2013
Where: Anywhere you can get online
For more information: www.worldchampionbuckle.com



▲ ***Keep Hope Alive*** **by Nancy Anderson of Boulder, Colo. Sterling silver, leather, antique poker chip, tin, and swimming medal, 2012. 3½ x 4½ x ½ in. (64 x 89 x 1.3 mm)** Photo by the artist.



▲ ***Stingray Buckle*** **by Suenos: Arlette Kiefer and Kaspar Rueegg of Zurich, Switzerland. Silver manta teeth, 2007. 6 x 7½ x 1½ cm (2⅜ x 2 15/16 x 19/32 in.)**
Photo by Andrea Berclaz.



◀ ***Chased Buckle*** **by Mark Thone of Rochester, N.Y. Red Brass, 2011. 6 x 7½ x 1½ cm (2⅜ x 2 15/16 x 19/32 in.)**

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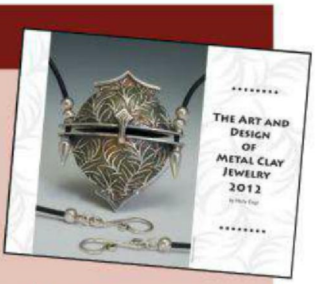


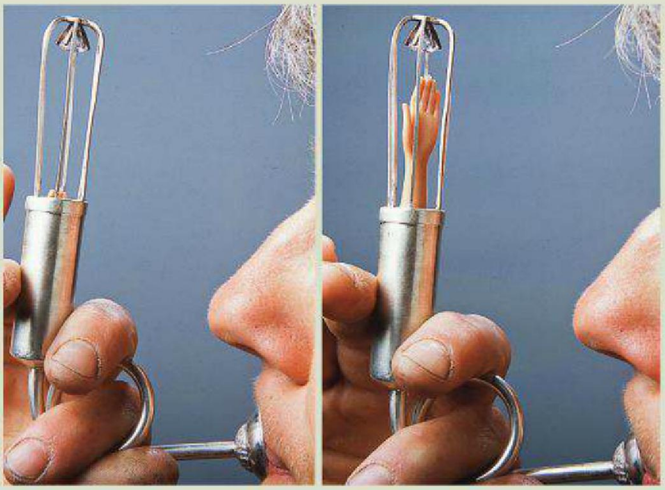
Metal Clay Calendar Submission for 2013

What: You can introduce yourself as Mr. March or Ms. July if your metal clay piece is chosen for the calendar "Art and Design of Metal Clay Jewelry and More 2013." Submit your necklaces, rings, bracelets, earrings, brooches, vessels, or any object, as long as the predominant material is metal clay. New, unpublished, unseen work is preferred.
When: June 15, 2012 – August 15, 2012
For more information: www.hollygage.com

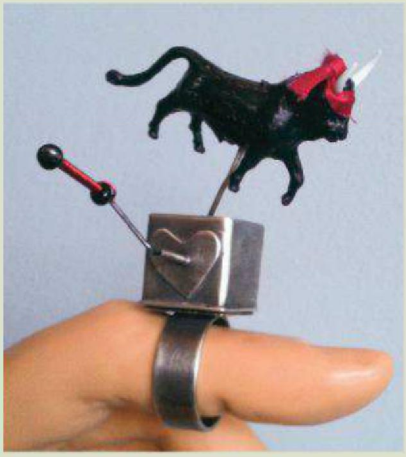
WORKSHOP

Kinetic Jewelry

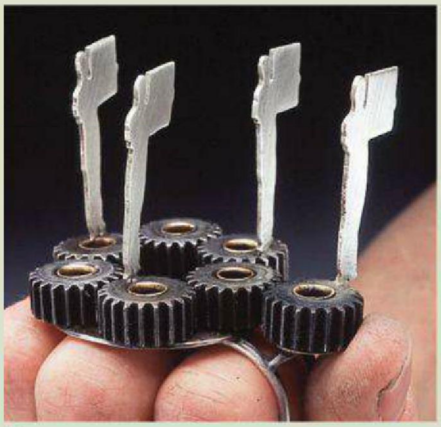
What: Put some movement in your work! Sarah Doremus will teach you how to make brooches that spin, rings that expand, and necklaces that reveal hidden chambers. Incorporate hinges, springs, and other mechanisms to get your jewelry to do something. Basic metal skills are recommended.
When: September 1–3, 2012
Where: Snow Farm, Williamsburg, Mass.
For more information: www.snowfarm.org
To see one of Sarah Doremus' pieces in action, go to www.artjewelrymag.com/videos



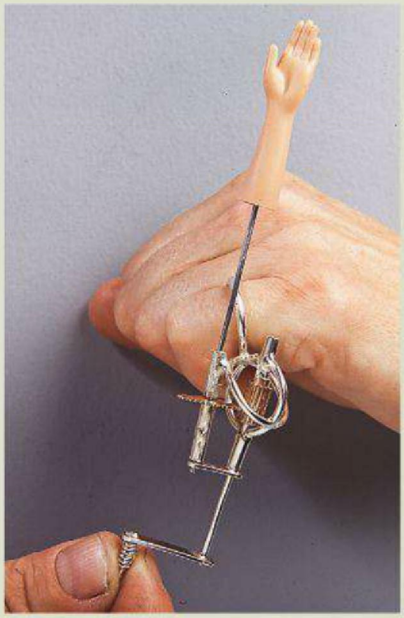
▶ ***Barbie meets Sisyphus ring*. Sterling silver, plastic Barbie hand, cubic zirconia, and cork.** Photo by Dean Powell.



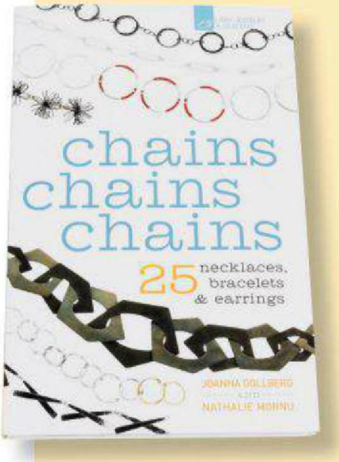
▲ ***Love is Blind ring* by Sarah Doremus and Moriah Nutter. Sterling silver and found objects.** Photo by Sarah Doremus. **To see this ring in action, go to www.artjewelrymag.com/videos.**



▲ ***Opposing Forces ring*. Typewriter gears, brass tubing, and sterling.** Photo by Dean Powell.



▶ ***Queen Elizabeth Wave ring*. Sterling silver, plastic Barbie hand, and watch gears.** Photo by Dean Powell.



Chains, Chains, Chains
25 Necklaces, Bracelets & Earrings

Book review

By Joanna Gollberg and Nathalie Mornu
Sterling Publishing Inc., 2011
$24.95, 978-1-60059-598-1

Think you've mastered chains? Think again. This book contains simplified instructions for how to construct 24 chains that push the boundaries of the typical chain. Some are simple, some are complex, and you'll want to make all of them. If you need to brush up on your metalsmithing skills, this book also contains a reference section that includes metals and their properties, bench tools and equipment, techniques, soldering, and finishing. Be inspired by a gallery of nontraditional chains, and learn to notice the chains that can be found all around you. A fun bonus: a list of songs with "chain" in the title — now, go build your chain-making skills while listening to your new studio music playlist!

One of the authors, Joanna Gollberg, was interviewed in our March 2011 issue, and her project, "Fresh Prongs," was featured on the cover of our July 2011 issue. — *Annie Pennington*

READER FORUM

continued from page 12

pieces and think their class piece will turn out just the same. They don't realize the time taken in sanding for the perfectly smooth surface, the layers to build dimension, etc. I try to explain we are learning techniques that they can use to create their own masterpieces, but your saying really sums it up.

Thank you for every article you write. I always learn at least one thing (sometimes more), that I can use to make myself a better artist.

— Karen
via email

Education issue

Thank you for the education issue [March 2012]! I've registered for a week-long workshop this summer, and as a fully self-taught metalsmith, I am intimidated by my choice of classes — Tom Muir, teaching mechanisms. Your articles, *Teaching 101* [by Michael David Sturlin] and *Find a Class that's Right for You* [by Kristin Sutter], were helpful by making me feel I made a good choice and giving me pointers on how to prepare. I'm still intimidated, but looking forward to a great learning experience.

— Katie
via email

Etching tip follow-up

In the May 2012 Reader Forum, Dana Evans recommended using an inexpensive but highly rated laminator to adhere PNP paper to metal. We received a few questions from readers. How many times should the metal be run through the laminator? Are you laminating the piece as it goes through the machine?

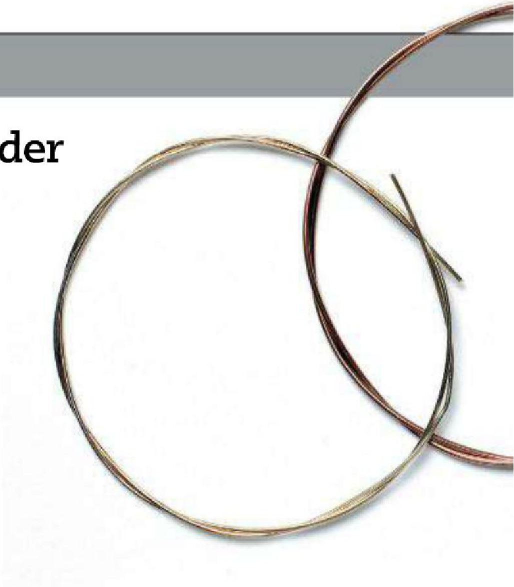
Dana Evans responds: *The laminator is used without any laminate plastic. The heat from the laminator, plus running the metal/PNP through the rollers in the machine, create enough heat and pressure to meld the toner to the metal. I usually put it through about 10 times and let it cool completely before peeling off the PNP.*

tell us what you think!

Send your questions, comments, and tips via email to ***editor@artjewelrymag.com.*** *Letters may be edited for clarity and length.*

PRODUCT REVIEW

Brass and Copper Solder



We recently had the opportunity to get our hands on some of the brand new copper and brass solders being developed by Rio Grande. Especially in today's economy, I know a lot of people (including myself!) who have been working more in copper and brass, which is why I was so excited to take these solders for a test run. I went through several basic soldering exercises: sweat- and line-soldering, soldering wires onto sheet, soldering domes and bezels to sheet, and making plain-band rings. Here are a few of my observations:

Flow

In terms of soldering, the copper solder performs in the range of medium to hard soldering time/temperature. It flows quickly and well, and bonds tightly.

In contrast, the brass solder takes a little more time, heat, and effort. Even on clean, sanded brass, the solder would bead up for a second or two before flowing, and when it finally flowed, it did not flow far. Most of the same joins that I had made successfully with silver or even copper solder did not solder completely with the brass, and I found I had to solder more than once for a complete seam. I got better results by using many small pieces of solder at closely spaced intervals than I did by using larger pieces.

Color

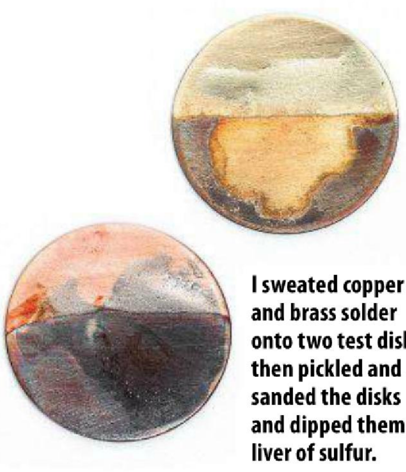
In color, brass outperformed the copper. The copper was a perfect color match straight out of the pickle, but sanding or finishing brought out a steel-grey color at the seam. It was not unattractive, and it showed against the copper less than traditional silver solder did, but I could still easily make out the seams.

The brass solder stayed the same color throughout the process. It was shiny even after heating and quenching, and only seemed muted when just out of the pickle. Sanding and finishing work showed it to be an almost exact color match — when I was finished with the plain-band ring in brass, I was unable to make out the seam.

Patina

I tested with only liver of sulfur (LOS) on both metals; bear in mind that other patinas may react differently with the solders. (I also tested a heat patina, but only with the copper.) The copper solder took color well, but was still somewhat identifiable from the copper sheet. The colors with cold LOS were more muted on the solder than on the copper, and the warm LOS yielded a darker black on the solder than the copper. With a heat patina, the color match was close to perfect.

The brass solder did not appreciably change color with LOS. Even with a warm solution, the solder stood out, only darkening to an "antique" brass finish, and showed up in contrast to the metal around it.



I sweated copper and brass solder onto two test disks, then pickled and sanded the disks and dipped them in liver of sulfur.

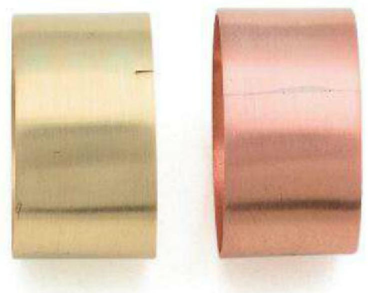
It's new!

definite step forward in color-matched solders for brass and copper

Thoughts

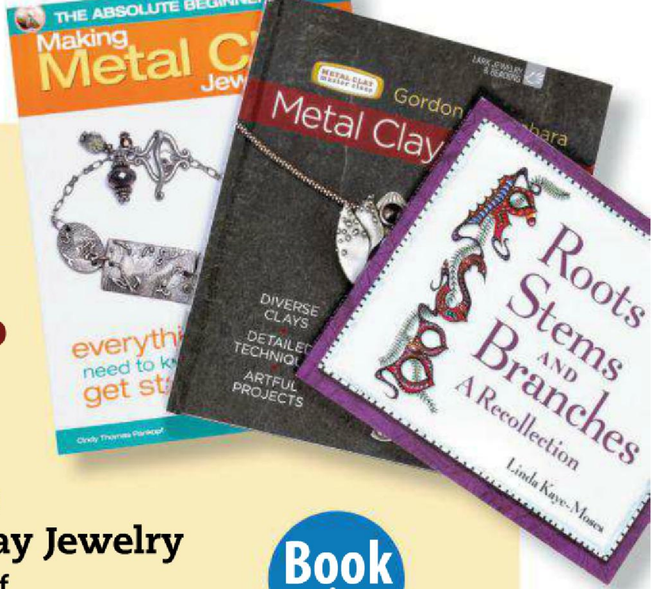
I really liked both the copper and brass solders for the fact that they are a definite step forward in color-matched solders for brass and copper. The brass solder was a little frustrating to work with, but I imagine that, with a little practice, I will overcome the flow difference and complete seams in one firing, and I thought the antiqued finish of the patinated solder was very handsome. With the copper, masking the solder with a heat patina was easy. Other than that, though, I actually enjoyed the steel-grey color of the finished copper solder and am imagining how to make creative use of it for jewelry! — *Reidin Dintzner*

These plain band rings demonstrate the barely visible solder seams. The brass was so close in color that I cut a line in the brass to remember where the seam was.



WHERE TO BUY

Copper and Brass Solder
Still in development
Rio Grande, www.riogrande.com



Metal clay lovers have a wealth of new books to choose from.

Book reviews

The Absolute Beginners Guide: Making Metal Clay Jewelry

By Cindy Thomas Pankopf
Kalmbach Books, 2012
$21.95, ISBN: 978-0-87116-431-5

If you've never worked in metal clay, this is the perfect place to start. Pankopf offers a detailed entry-level guide, ensuring that metal clay newbies start off with a solid foundation of skills. The generous use of clear, informative photos means that each step is shown as well as described. Other guides may list the tools needed; Pankopf first covers the function, and then lists different tools that serve that same function, so that readers can choose the tools that suit them best. The instructional approach continues throughout the 20 projects, as Pankopf tells readers not only what to do, but why they're doing it. This is a great launch point for anyone who wants to learn how metal clay works, and how to work with it.

Metal Clay Fusion

By Gordon Uyehara
Lark Crafts, 2012
$27.95, ISBN: 978-1-60059-697-1

One of the true giants in the metal clay field, Gordon Uyehara, has shared his knowledge and insights in classes, workshops, and magazine articles (including *Art Jewelry* magazine). Now he's produced a book that's intended to be a "Metal Clay Master Class" in print. Aimed squarely at intermediate-to-advanced metal clay users, *Metal Clay Fusion* skims quickly over the basic techniques, focusing mostly on refining existing skills, then covering design theory and advice for professional-level artists, before moving on to the projects. The projects are well-suited to the assumed skill level of the readers, using a few beautifully shot and well-chosen photos to illustrate key points, rather than spelling out each step. Interspersed throughout the first half of the volume are lovely images of work by some of the most accomplished artisans working in metal clay.

Roots, Stems & Branches: A Recollection

By Linda Kaye-Moses
Canacola Works, 2012
$70.00, ISBN: 978-1-4507-9621-7

Described as a "mixed-media memoir," this isn't an instructional book, but rather an autobiography. Kaye-Moses started making jewelry in 1976, and is known in the metal clay world as the author of *Pure Silver Metal Clay Beads*. This deeply personal volume traces her development from a girl whose artistic determination was frustrated and sublimated to a woman who discovered her creative outlet in jewelry — and never looked back. — *Hazel L. Wheaton*

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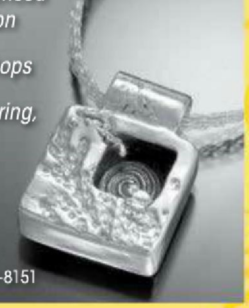

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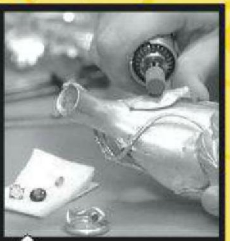

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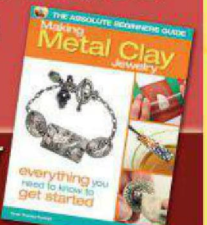
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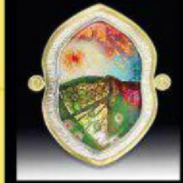

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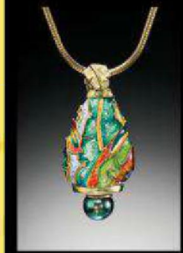

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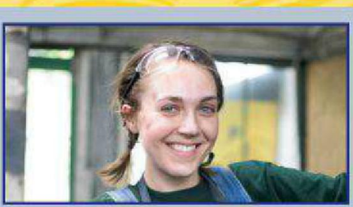

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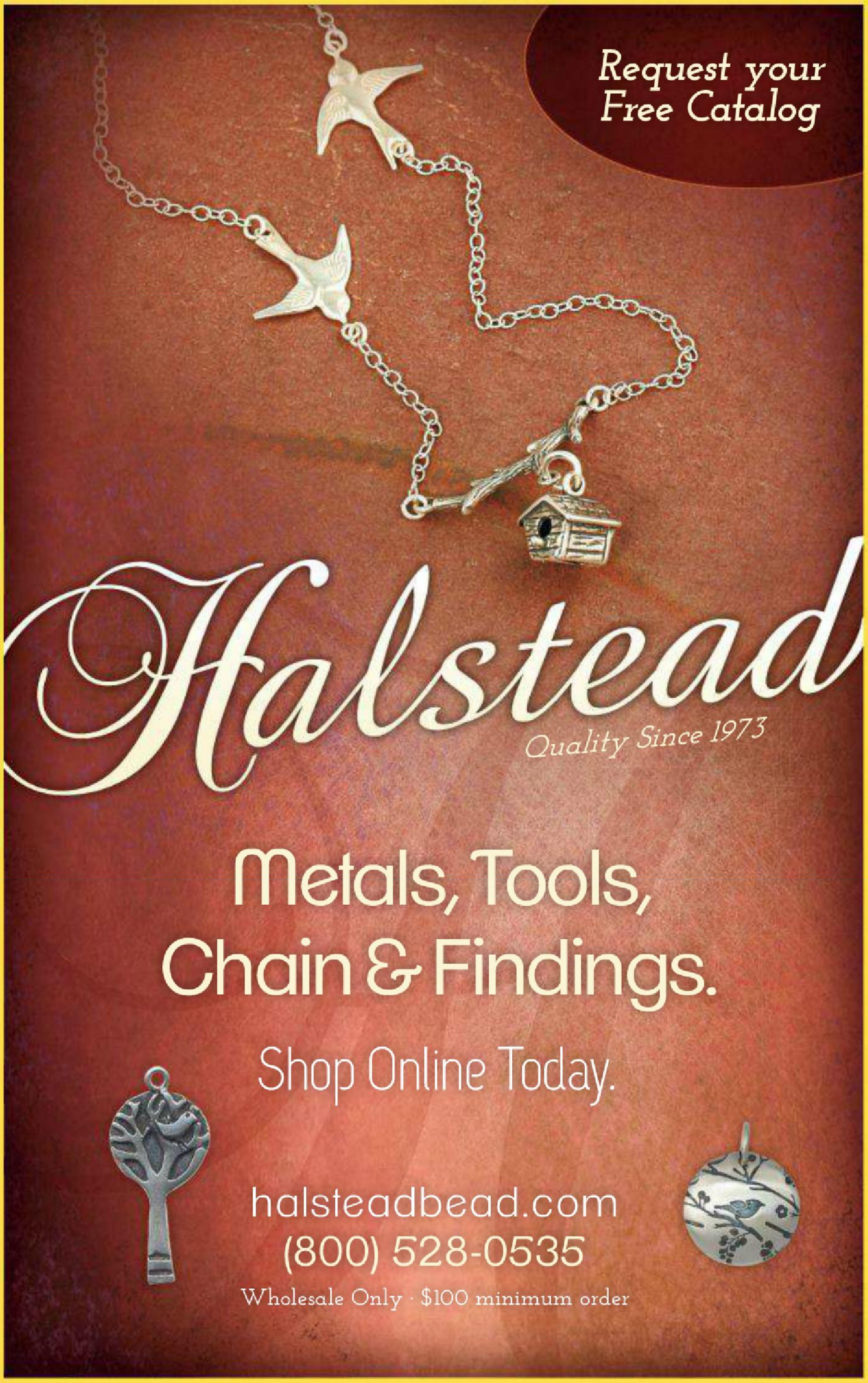

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Metal Forming 101: Sinking and Raising

by Michael David Sturlin

Sinking and raising are hand-working processes used to give volumetric form to metal sheet. These two processes are commonly used together in forming vessels, plates, hollowware, flatware, and sculptural forms. These same techniques are also employed by goldsmiths in the creation of jewelry-scale objects. In both sinking and raising, metal is given volume by skillful and coordinated manipulation of hand and tool. This requires not only fluency with the material but also an understanding of cold working and annealing. Knowing the limitations of the material you're working with — how far it can be pushed and when it needs to be softened — is crucial.

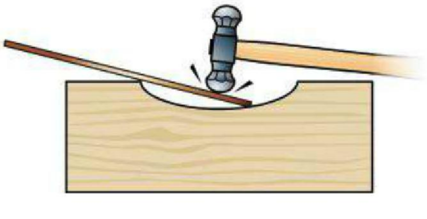
Equipment

Metal-sheet-forming techniques usually employ an assortment of simple tools: blocks, stakes, hammers, and mallets. There are a few basic tools that serve many purposes. There are also many specialty tools used for specific applications.

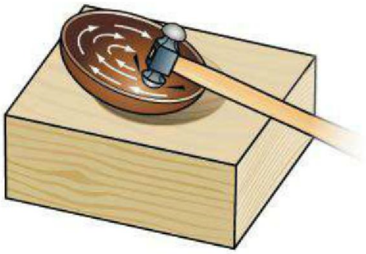
Sinking

The process of sinking is a relatively quick and efficient way to form metal. On a smaller scale, we might call this process "doming," "dishing," or "dapping." Think of a dapping block and punches used for making domed shapes like hemispheres. The basic process is the same, but sinking implies a larger tool and a larger object.

The primary technique for sinking is using a round hammer face (ball peen, or ball hammer) and a shallow depression in a tree stump or block of wood. The round face of the hammer strikes a sheet of metal positioned over a depression; the metal is "sunk" into an indentation to create a form.



When making a bowl-shaped form, start at the edge of a disk of metal sheet, and work in courses of concentric circles inward from the outer edge toward the center of the disk. The hammer blows should fall on the inside of the bowl and gradually stretch the metal down into the indentation. Don't start at the center of the disk; this will make it harder to achieve a smoothly rounded form.



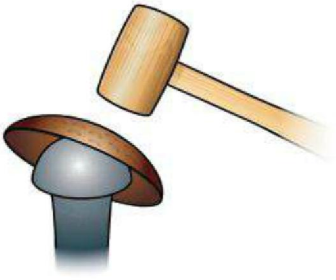
Just like any other forming technique, sinking work-hardens the metal, and the metal will often require repeated courses of forming and annealing. After each course of sinking, reverse the direction in which you're working. So, if you were working in clockwise circles, switch to counterclockwise circles on your next course. If you need to anneal your piece, anneal it between courses rather than mid-course.

Due to the nature of the process (working from the inside surface), sinking is not suited to deep forms or those with small openings. It works best for forms like plates, saucers, shallow bowls, and open vessels. Many of these types of objects can be sunk, shaped, formed, and finished without annealing. As the metal hardens in the final course of shaping, the effect of the hammer blows are lessened, and the surface of the metal can be further refined by planishing.

Boughing

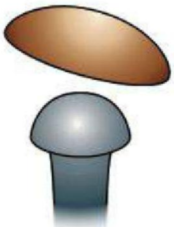
There is an intermediary process of shaping metal during sinking or raising, called "**boughing**" (or "bouging"). During raising, the metal can develop bunches and creases; during sinking, the problem is usually lumpiness. Boughing is how you get rid of these flaws and further establish the roundness of the form.

Usually done with a wooden mallet over a wood bock or metal stake, boughing is an action of smoothing the surface in between stages of hammering. The intention is not to change the contour of a dome or accentuate the exterior shape of the object so much as correct the evenness of the surface, so the process requires working over a stake large enough to occupy much of the interior of the form. When you support the form over a wooden (rather than metal) stake, you can use hammers instead of mallets.



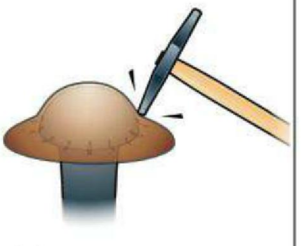
Raising

To achieve forms deeper than a shallow bowl, silversmiths rely on a different approach: raising.



Raising is a process of using the force of hammer blows to bend metal sheet over a rigid form, such as a metal or wooden stake secured in a vise. In sinking, you work on the inside of the piece; in raising, you work on the outer surface, forcing the metal into a smaller diameter by controlled pleating and smoothing. Where sinking thins and stretches the metal, raising compresses and thickens the metal.

Raising is frequently done with a cross-peen hammer. The technique requires holding the metal at an angle to the stake, striking downward in order to "pull" the metal over the stake. Raising can be done forward — striking down and in front of the stake — or backward — striking away from (behind) the stake. In either case, the hammer forms a crease in the metal, which reduces the outer diameter.



The hammer strike is also at an angle to the stake and is therefore not forging the metal by compressing it directly between the hammer face and the surface of the stake. In raising, the hammer blows are hollow: They are falling on air. That is to say, they are not supported by the stake due to the angled relationship of metal to stake and hammer to metal.

The position of the work and direction of approach depends on the hammer and stake being used, the size and shape of object being formed, and the skill and preference of the individual smith.

During raising, the movement of material inward from the bottom upward causes the metal to crease and gather, which in turn causes the upper edge of the object to thicken. The creases or pleats that form during each course are smoothed, as needed, by boughing.

tool options

Absent a tree stump, you can make your own forming blocks by fashioning indentations in the end grain of scraps of lumber. Look in the cutoff bin in the lumber department of your local home-improvement store.

You can use nonrigid materials, such as sandbags, leather, Styrofoam, cardboard, and even folded fabric in place of a wood block. For the forming process, you can use a mallet and punch as well as directly applying a steel hammer face to the metal.

Additionally, the wedge-shaped face of the hammer leaves deep tool marks in the metal. These marks will normally be smoothed out during the refining and planishing stage. As with sinking, the best results in raising come with reversing direction on each course of hammering.

Raising requires frequent annealing as the hammer blows work-harden the metal. In the final stages of forming, this hardening is purposeful; the final finishing is usually done with the polished face of a planishing hammer. The planishing produces a strong and resilient form and imparts the characteristic hammer marks that denote skilled handcraft.

Planishing

While sinking and raising give shape and volume to an object, planishing can be thought of as a process of refining the surface. Planishing is done over a steel stake, usually with a planishing hammer. You can use other types of hammers, but the stake should always be larger than the face of the hammer in order to achieve the desired effect. As the outer surface of the work is covered with hammer blows and patterned with controlled tool marks, the inside surface that contacts the stake will become smooth. (A good example is a handwrought copper cooking pot on display at a high-end culinary store.) It's possible to achieve a highly polished surface with well-placed blows of a polished-face planishing hammer.

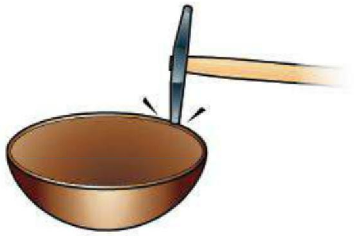
Planishing is also the final course of work-hardening given to most sunk or raised forms. In many objects, the quality of the surface is an aesthetic choice that complements the form. A well-planished surface produces a distinctive hand-wrought quality and handmade appearance that is not possible to replicate by other means. Planishing with something other than a round hammer face can impart a texture other than round marks or a dimpled pattern.

Bottoms and edges

The bottoms of bowls and the centers of plates often require flattening and defining. There are various ways to accomplish this. Flattening can be done with the work supported over a stake, on an anvil, or on a wood block. Or, you can leave your work unsupported, striking blows with the face of a hammer or mallet.

On forms with large flat areas, such as plates and saucers, you may need to "set" the bottom after each course of raising and annealing. Work in a spiral from the center to the outer edge of the flat area. This will keep distortion to a minimum.

The top edge or rim of a raised object will also likely need a bit of attention. If the raising has been uneven, you can first correct it with a file. You can then "upset" the edge to make it visually more appealing. To upset the edge of your metal, hammer directly down on it with a steel hammer, forging and compressing the metal and producing a thicker edge at the top of the wall. Upsetting stabilizes the shape and reinforces the edge while adding the visual benefit of a thicker rim.



For objects like bowls and vessels, upsetting is usually done with controlled blows of a cross-peen hammer parallel to the rim or with the face of a planishing or goldsmith's hammer. This is sometimes done at the end of each course of raising as the object gets closer to the final shape and dimension.

Michael David Sturlin is an award-winning goldsmith, jewelry artist, and educator. He may be contacted via email at michaelsturlin studio@cox.net.

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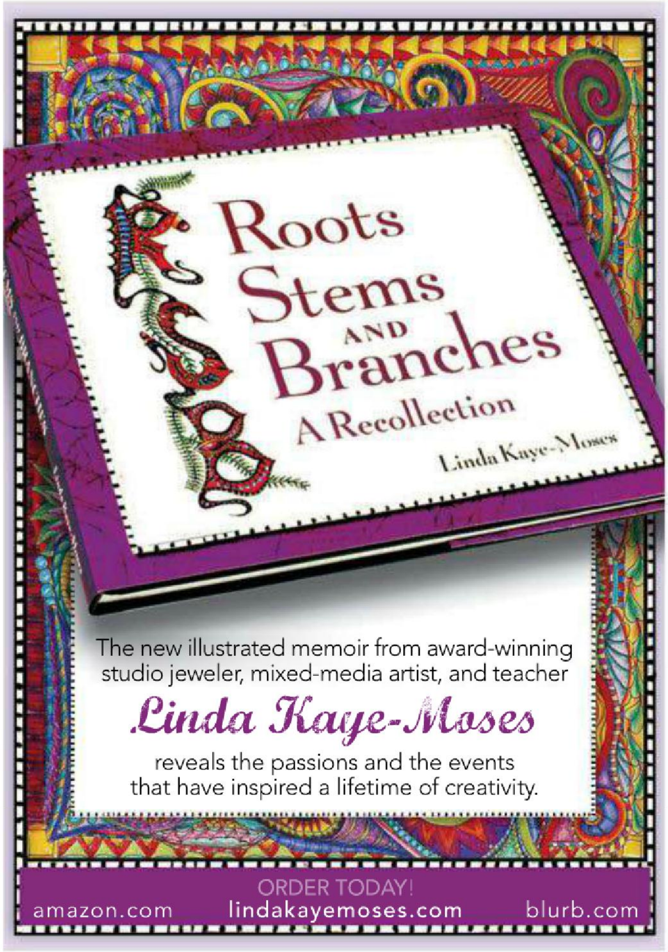

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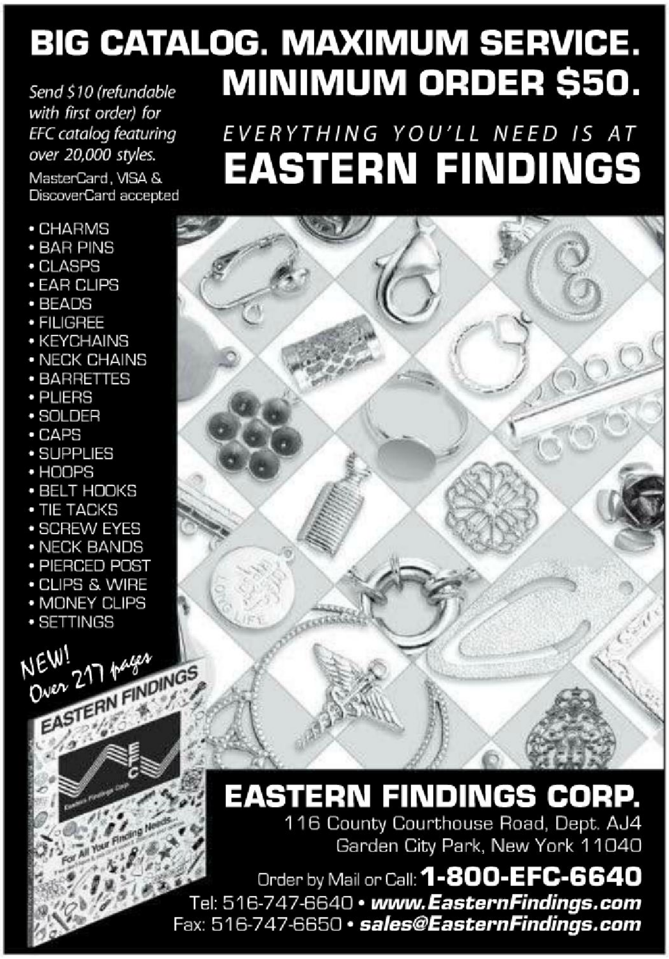

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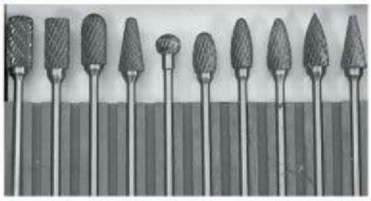

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A Gem Shopper's Toolkit

by Richard M. Shull, G.G.

Every year, the number of gemstone varieties available for jewelry use grows. "Old" gemstones come back into fashion as a new deposit is found. "New" gemstones are discovered that may be a new type or color variation, or they could be created by a new cutting style, treatment, or lab technique. It can seem like a daunting task to ensure that the stones you're buying are of an acceptable quality or are really what the seller says they are. The following tools and basics are the foundation of a confident gemstone buyer, and they can be used by a first-time show visitor or a seasoned expert.

Not in the kit: A magic wand

Over the years, the process of purchasing gemstones has changed. Once, buying stones meant traveling to a showroom or office, attending gem shows, or even visiting an overseas gem district. A major show is still the best place to see what's new and be able to view and examine a huge selection of gems face to face. Mail-order catalogs, while still popular, have been joined by the connectivity of the Internet. A modern buyer can choose from a worldwide selection of gemstones and quickly make price comparisons.

Unfortunately, there's no magic wand that can tell you everything you need to know about a gemstone before you buy it. Even so, utilizing some simple tools and observational techniques when choosing your stones will allow you to have confidence in your purchases.

Whichever avenue you choose, make sure your supplier has a return policy, so that you have the opportunity to examine the gemstones to your satisfaction when you have them in your hands.

Mental tools

A gemstone buyer's "toolkit" is really a combination of physical and mental tools. Before you venture to a show or a merchant's showroom, or place an order, knowledge of the gemstones you're interested in is one of your most effective tools. In other words, do your research.

A simple online search will often provide answers to the basic questions you should ask about most gemstones, and it will help you decide which physical tools to take with you to make sure the gems are truly as represented. Some of the most important questions are:

- Does the gemstone have frequently used treatments or enhancements? Do those treatments vary according to the color of the gem? Do they affect the stone's value?
- Are there synthetic varieties or common imitations to be aware of?
- What are the signs to look for to determine if the gem is high, medium, or low grade?
- Does the gem have a telltale property that makes it easily identifiable?

After performing the gemstone's "background check," you can decide what physical tools you'll want with you to confirm the identity and quality of a gem you are considering for purchase. When purchasing from a known, reputable supplier, you may be able to rely on their reputation and judgment. But, when in doubt, it doesn't hurt to have a few tools (and the knowledge of how to use them) on hand.

When evaluating a stone, you're trying to accomplish several things at once. First, and most basic, determining whether the gem is what it is presented to be. Other goals include making sure the stone is the right size for your needs, or determining whether it exhibits a desired property, such as play-of-color in opal, asterism in star sapphire, or chatoyancy in a cat's eye tourmaline or chrysoberyl.

Physical tools

There are four basic items that are indispensible in the studio and while traveling. These a pair of tweezers, a millimeter gauge, a 10X-power loupe, and a penlight.

Tweezers are a must-have if you're going to be buying faceted stones. Tweezers are the easiest way to hold a gem so that you can inspect it from all sides. Be sure to practice picking up stones in a safe space — much like practicing with chopsticks before you try to eat with them in public. When you're examining a nice stone at a show, the last thing you want to see is that stone flying across the room!

If your design calls for a specific size cabochon or faceted stone, check each one you're considering for purchase to make sure it really is the right size. A sliding- or dial-type **millimeter gauge** ensures that you know the stone will fit before you buy it, saving the time and hassle of finding out that it was just a hair too small and having to start the process over again.

Your **10X-power loupe**, combined with a pocket-size **penlight**, and knowing a few things to look for, can prevent costly mistakes. This is where a little research goes a long way. Things like gas bubbles in transparent gems, which indicate that they are glass, or the curved "striae," or lines, found in synthetic sapphires, are telltale signs your loupe can help you to see.

When going gem shopping, take tweezers, a penlight, a loupe, and a millimeter gauge with you. Photo by Helen Constantine-Shull.

Quick "tells"

A loupe and penlight are usually all you need to determine if a fractured lower-grade ruby has been treated with lead glass to imitate a high-quality stone. You know that the ruby has been fracture-filled with glass when light reflecting off the stone shows a crazed or fractured surface; or when light shining into the stone reveals reflections of colors such as blue, green, yellow, and orange; and especially when you can see gas bubbles.

Other damning signs to look for with your loupe are dye in fractures, surface cracks, and bubbles in the glue of stones that have been assembled.

You can evaluate stones that exhibit phenomena such as play-of-color, cat's eyes (chatoyancy), or stars (asterism) just by shining a penlight on them. Move the light side-to-side or up and down, and you can easily determine the quality of an "eye" or a "star" and whether an opal's colors can be seen from more than one direction.

The tools and techniques for identifying and evaluating gemstones are always evolving, and the opportunities to learn more are constantly expanding. Extensive testing requires more specialized equipment, of course, but these basic tools will help you conduct a quick, effective quality check before buying. AJ

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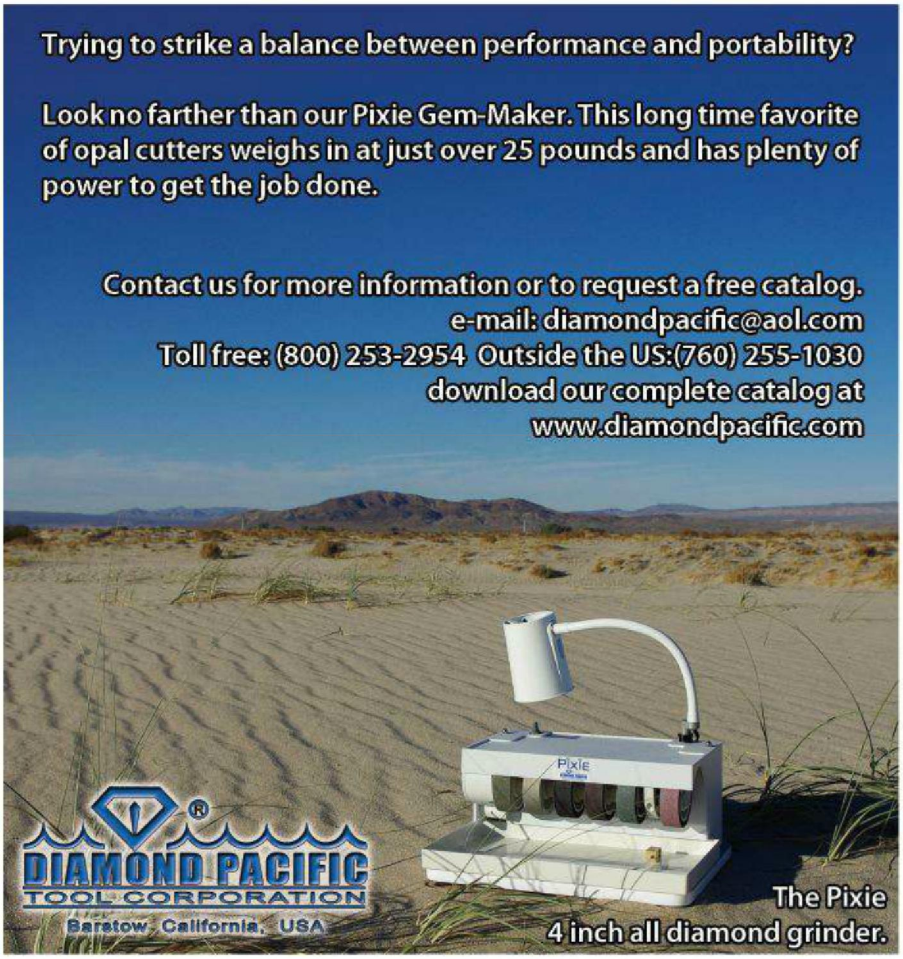

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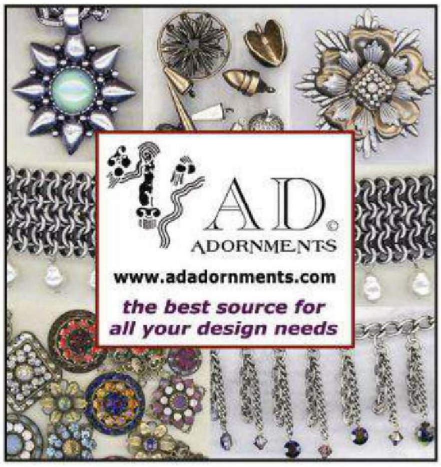
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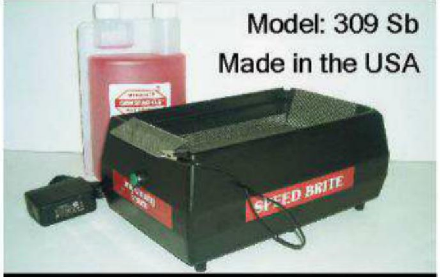
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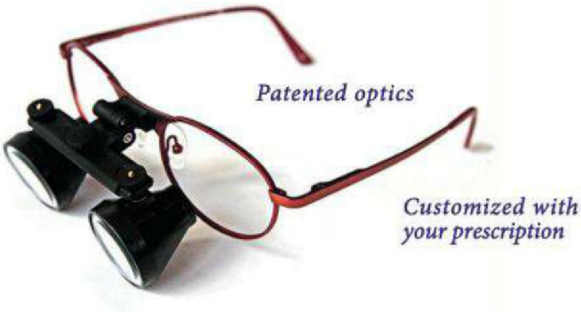

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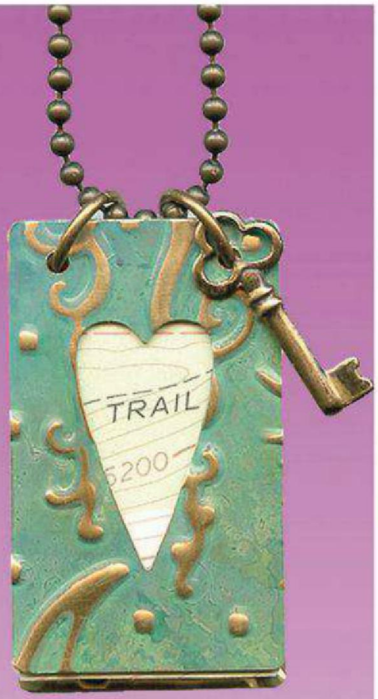

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Smoothing Things Over: Finishing and Polishing

by Andy Cooperman

What is gray, green, white, brown, blue, or black; has a square edge, a knife edge, is pointy, or cylindrical; is hard, flexible, yielding enough to be shaped; can smooth, blend or contour metal, ceramic, plastic and glass; can polish and shine and is available from pretty much any supplier?

Rubberized abrasives

Rubberized abrasives are exactly what their name suggests: abrasives bound in a solid cake of rubber or plastic. You are probably more familiar with the brand names, as the most common — Cratex — has become something of a default label for this type of attachment. There's more than one maker, however, and tons of options in grits, shapes, and sizes.

Most wheels are sold loose and are used with a screw mandrel, although some come permanently mounted. For some jobs, rubberized abrasives can be used with bobbing, tripoli, or rouge compounds for buffing and polishing. As always, however, large surface areas are better served by larger buffing and polishing wheels charged with these compounds.

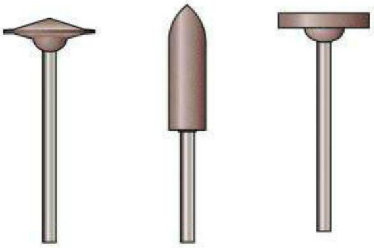
There are several factors to consider when selecting a rubberized abrasive attachment. With silicon carbide being the most common grit (Mohs hardness 9.5, see "Flex Shaft Fundamentals: Abrasives and Grinders," May 2012), and a consistent array of sizes and shapes among brands, the main differences between rubberized abrasives are the nature of the binder, how fast it wears, and its relative hardness or flexibility.

Rubber or silicone

When it comes to the binder, there are two main options: rubber and silicone (not to be confused with silicon carbide, which is the grit). Some say that silicone is a softer binder than rubber, but the main difference is shelf life: Like a pencil eraser, rubber grows dry and brittle over time; silicone doesn't.

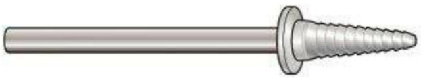
Shapes

Makers include the aforementioned Cratex, Dedeco, AdvantEdge, Pacific, and the dental companies Eve, Edenta, and Shofu. Unfortunately, there is no consistent color-coding across brands; one's blue is another's black. Choose these accessories as you would a file: Select the one that approximates the shape that you are working on. Wheels, cylinders, and points all have their applications and are available from most manufacturers.



Mandrels

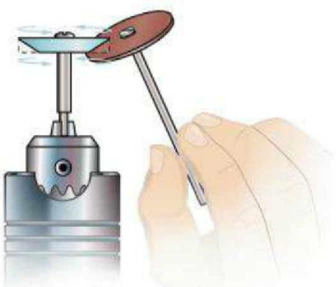
If you buy loose wheels, you'll need to mount them on a mandrel to use them in the flex shaft. Aside from screw and specialty mandrels, there is the point, spiral, or threaded taper mandrel, which is like the tapered spindle on a buffing machine. Cylinders, bullets, and points, all of which have a hole in the base, are twisted or screwed onto the mandrel. Some people mount wheels on these tapered mandrels as well, but I don't like the protruding end of the spindle and prefer a screw mandrel.



Fine tuning: Dressing

I consider the fresh-from-the-factory shapes of attachments to be pre-forms — close, but in need of fine-tuning. In the shops where I've worked, the bottom inch or so on the flat side of any ring file was invariably concave and shiny, the teeth polished off long ago from shaping rubber wheels. (Most of these abrasives are harder than steel or even sapphire, and they can damage most stones.)

It seems a shame to wound a nice file, so I dress my rubber wheels and points by spinning them against a large silicon carbide separating disk, which I manipulate to give the abrasive accessory the shape I need. Square-edge wheels can be sharpened into a knife-edge or rounded, and points can be made pointier. I often bevel the back edge of a wheel so that it trails off toward the underside; this lets me get in close to the piece without hitting the screw on the mandrel. There are also small diamond or carborundum dressing stones.



Beveling a wheel

⚠ **SAFETY NOTE:** Wear a mask! Abrasive dust is hazardous!

Brands

Cratex

Hard synthetic rubber, silicon carbide grit

"Cratex" is often used to mean any rubber wheel. The company has been around for a long time, and despite the Cambrian Explosion of brands and species in recent years, Cratex is still a popular choice. The rubber (not silicone) is fairly hard and, once dressed, holds its edge. I pretty much use only the gray/green extra-fine ⅞ x ⅛-in. (22 x 3 mm) square-edge wheels (which I shape) and points. Cratex seems to come from the factory with a glaze; spin the wheel against a dressing stone or separating disk to expose a fresh surface in order to ensure the wheel performs well. I have found old Cratex wheels to be brittle and not of much use. In brief, Cratex wheels:

- Come in square-edge and knife-edge wheels, cylinders, and bullets (points)
- Are available in coarse, medium, fine, and extra fine grits
- Should be mounted on screw mandrels (for wheels) or on spiral mandrels (for cylinders or points)
- Will cut most stones (including sapphire), steels, precious metals, ceramic, wood, glass, and plastic

AdvantEdge

Various grits and binders

According to my research and the friendly folks at Rio Grande, this broad family of rubberized abrasives is their baby, available only through them. AdvantEdge products come in the usual shapes, either loose or mounted, the latter including small wheels and points similar to Shofu and other dental manufacturers (see *below*). The basic abrasive is silicon carbide, but there are also pumice wheels.

The big variable within this family is the binder: rubber, silicone, or "rubberized," a term that is unclear. In any case, these wheels, disks, and points are worth checking out. I primarily use the 22 x 3 mm (⅞ x ⅛ in.) black (medium), silicone, square-edge silicon-carbide-grit wheels for shaping and smoothing, prior to using tripoli or creating matte surfaces. They conform nicely to round or curved surfaces. The harder rubber version is useful when a crisp edge is required.

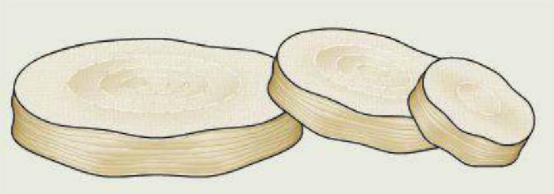
Shofu

Silicone rubber, silcon carbide grit

When I was a sparsely feathered fledgling metalsmith, a young dental-technology student named Morty (who was intent on dating my sister) gave me a small kit of crown and bridge polishers (it's still available from some suppliers, such as

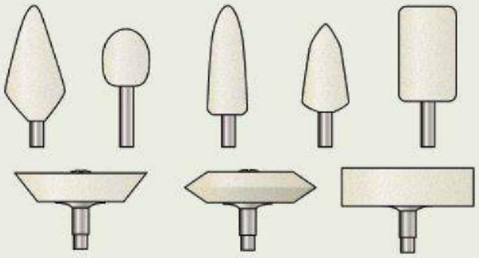
finishing: buffs and bristles

Buffing and polishing with the flex shaft is like using an agile and diminutive buffing machine. Along with variable speed and small size, you can move both the work and the buffing wheel, which gives you access to tight spots. You've got a range of choices for finishing accessories.



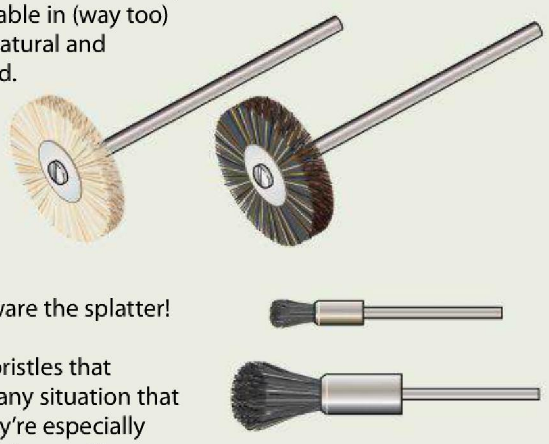
Muslin buffs

Muslin buffs as well as hard and soft felt wheels and cones come in a variety of sizes and mount on a screw or threaded-point mandrel. Use the same logic as you would at the buffing machine: Keep your different buffing compounds separate, use wide, soft muslin wheels for broad areas, and use hard felt for details and high spots.



Felt wheels and cones

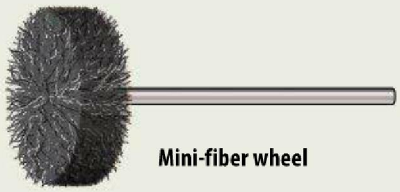
Bristle brushes get a lot of use in my studio, most often for bobbing compound, tripoli, and rouge. They are great for accessing small or complex areas. As always, keep your compounds separate. Available in (way too) stiff, medium, and soft bristles, both natural and synthetic, and mounted or unmounted. My brush of choice is the ¾-in. (19 mm), medium bristle, mounted. I use them at slower speeds (faster for rouge), charging them frequently. High speeds tend to leave a glaze of baked compound on the metal. I sometimes dip a new wheel in water and then pumice for a soft sheen. Beware the splatter!



Bristle wheels and end brushes

Permanently mounted steel or brass bristles that burnish as they spin are wonderful in any situation that would benefit from a satiny finish; they're especially awesome for bringing a reticulated surface to life. They're available as ¾–1-in. (19–25.5 mm) wheels and end brushes. Although conventional practice calls for using brass on yellow metals and steel on silvery, I use a ¾-in. (19 mm) medium-soft steel wheel at slow speeds for everything. Dipping the brush or the work in a jar lid filled with soapy water can improve the finish a bit, but it is messy — and never put a spinning wheel in the water! Wheels with crimped wires are stiffest. Occasionally using them in reverse keeps them from matting in one direction.

There is a variety of scrubby-type mini-fiber wheels that produce a satin finish. Light gray (coarse), gray (medium), dark gray (fine), and brown/purple (fine) indicates the aggressiveness. I often make my own by cutting a little disk from a kitchen scrubbing pad and poking a hole in the center. They don't have to be perfect. (Sounds like heresy, but I stamp out mine with my disk punches!) Use a screw mandrel with these.



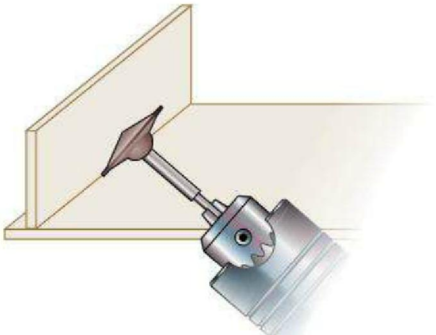
Mini-fiber wheel

Otto Frei). At that time Shofu abrasives were available pretty much only from dental suppliers, used in the lab — and the mouth — to polish metal crowns. I fell in love (so did Morty). Here's the scoop on Shofu:

- Relatively hard silicone binder with silicon carbide grit
- Come mounted on 3⁄32 in. (2.4 mm) mandrel or loose (fit screw and point mandrels)
- Cylinders, bullets, square-, and knife-edge wheels, thin and ultra-flexible "floppy" wheels
- Will cut like Cratex but much finer
- Coarsest to finest: Brownie, Greenie, Supergreenie

Brownies are brown, but Greenies and Supergreenies are actually an identical blue color; the latter is distinguished by a yellow stripe on the mandrel. Shofus aren't cheap, so use them for special occasions rather than general cleanup. My go-to's are mounted brownie points (bullets) and mounted ⅝-in. (16 mm) knife-edge wheels, and less often square-edge wheels.

The knife-edge is great for cleaning up the corner of a T-seam or even a decorative saw cut for a super-thin, polished groove (even though the rubber is hard and can hold an edge, knife-edge wheels, like any rubber wheel, will need to be dressed or sharpened as you go). Use a light pressure and a medium speed. You can go straight from a Brownie to rouge. The Greenies and Supergreenies are great for delivering a precise polish in places where you only want a detail to shine, like a tiny appliqué, or a gold inlay on a molar. Try doing *that* with a rouge wheel. Thanks, Morty!



Cleaning up a T-seam

Assorted types

Skinny polishing rods/pins/points/sticks

Many rubberized abrasives are available in skinny 1-in. (25.5 mm)-long rod-like points (no hole). They are held in a special mandrel that's similar to a pin vise or a small drill adaptor. These points are wonderful for getting into tight places and can be sharpened into really fine points. Be sure you've set the rod securely; the longer the rod extends from the mandrel, the more likely it is to wobble loose or bend under pressure.

Pumice wheels

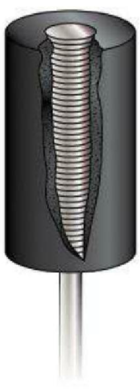
These accessories aren't very aggressive — and that's the point. Pumice is a relatively soft 6 on the Mohs scale, so it won't hurt most stones. As a loose powder, it provides a nice low-luster finish. When bound in silcone or rubber wheels, it's ideal for cleaning up bezels and prongs in which a stone is set.

Cratex, AdvantEdge, Dedeco, and Silipum all make pumice accessories. Cratex makes the classic pumice "Brightboy" wheels in natural rubber, which can dry out and harden; blue is finer, and white is coarser. Silipum and AdvantEdge wheels use silicone as the binder for their pumice wheels; the silicone remains flexible and the wheels hold up well. I like these. The light gray is less aggressive, the green more.

Pumice accessories are available in ½–1-in. (13–25.5 mm) square, rounded, and knife-edge wheels. All can be shaped and dressed.

NOTE: Even though pumice won't hurt most stones, heat, which is generated by excessive speed and pressure, can. Be safe when working around stones. Test the back of the stone first if it's possible to do so.

Inside-ring polishing cylinders



This shape comes in a variety of brands, grits, and binders. The cylinders are about ⅝ x 1 in. (16 x 25.5 mm) with a hole in one end that is threaded onto a strange-looking mandrel. This is a nice tool for the inside of rings or any curved surface. I have had great results "lapping" the outside of a flat band with these.

next time:
Burs!

Assorted brands

Edenta: A precise system of progressive polishers. The coarsest are rubber based. The finer polishers are silcone based and can be used on semiprecious stones.

Titan: Hard rubber and silcon carbide. Great for platinum and harder materials like stainless. Too hard and stiff for my taste.

Eve: Mounted silicone polishers (most likely silicon carbide), similar to Shofu. Worth a look.

Pacific: I really like these silicone wheels, because they cut quickly and are a nice blend between hard and flexible. They are similar to AdvantEdge. I use the medium, grey/green wheels (silicon carbide) and the pumice. Search the Web for availability.

The overwhelming and ever-increasing diversity of brands and types make the prospect of deciding "Which do I choose?" a tad initimidating. The bottom line on all of these accessories is experimentation. Order a selection and get scientific. Mark each one — you can write the serial number and supplier on the side of rubber wheels with a fine-point permanent marker — take an afternoon and try each one, and record your conclusions: "Too stiff, too fine, falls apart, glazes," etc. You'll know in a minute which works best for you.

Andy Cooperman has maintained a studio in Seattle since 1984 where he works with custom clients. His work is in private and public collections, including the Victoria and Albert Museum and the Tacoma Art Museum. He conducts workshops and seminars across the U.S. and taught in the metals program at the University of Washington, 2006–2008. Contact: www.andycooperman.com.

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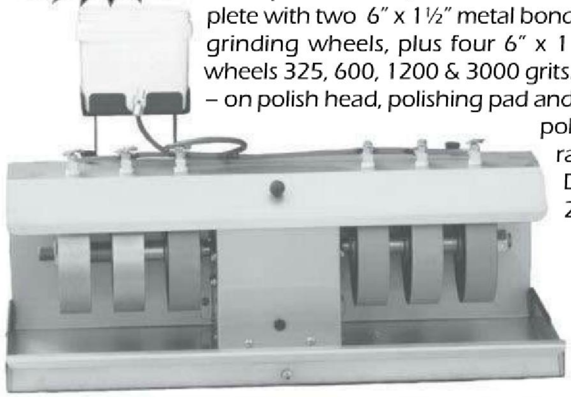

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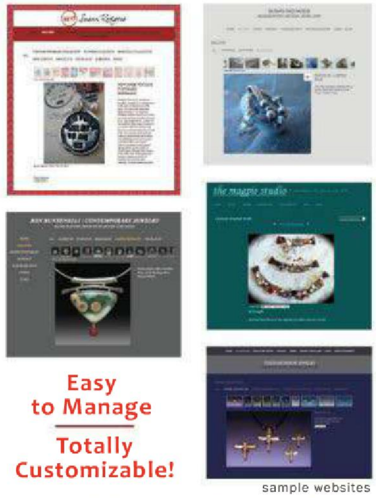

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Favorite Tools and Other Foibles

by Christopher C. Darway

Confess: You love working with your hands. The feeling you get from handling a fine tool is hard to explain to the uninitiated. The thing that separates us from the rest of the animal world is making and using tools. Okay, there are some monkeys that poke reeds into termite holes to retrieve treats, and an otter or two who crack clams with rocks. But, have you ever seen a monkey checking out a cordless drill or buying shop lights in a hardware store? No! I, however, look forward with bated breath to the arrival of my tool catalog from Rio Grande (and from Harbor Freight, for that matter).

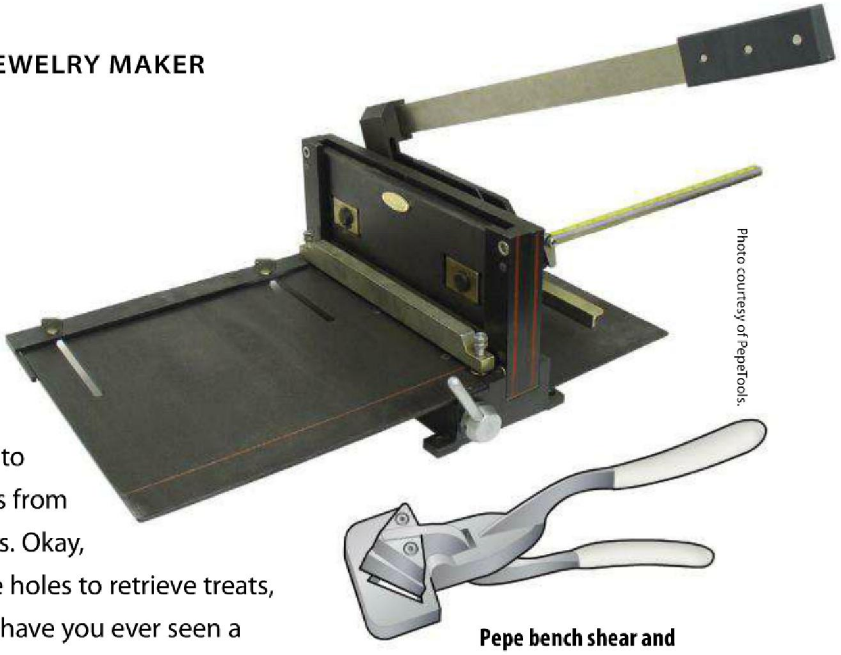


Photo courtesy of PepeTools.

Pepe bench shear and Roper Whitney hand notcher

Tool history and types

The earliest tools were rocks used to pound things (or fend off a troglodyte [caveman] or two); broken or chipped rocks were used to scrape and cut. Bronze spring shears appeared in Egypt around 1500 B.C., and pliers are descendants of Roman pivoted scissors dating to 100 A.D.

Tools come in three categories: Percussive, lever, and cutting. Hammers and striking tools are percussive, pliers and shears are levers, and cutting tools include saws, chisels, drills, and abrasives.

Most tools are based on two simple machines: the lever and inclined plane. An inclined plane is a wedge, and when a wedge is wrapped around a rod, it produces a screw. Pliers and shears are levers with a fulcrum. The pivot rod on a shear is the fulcrum, and by extending the handle in relation to the cutting blade, a tremendous amount of force can be exerted. Compare the difference between the handle length of a pair of scissors and a pair of metal shears.

Tool longevity

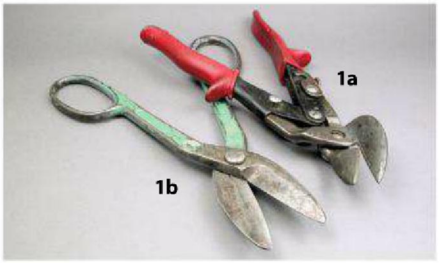
"Purchase the best tool you can afford." This was my professor's mantra, and one I still abide by. A good tool should last more than 30 years; however, the recent revelation of discounted movie tickets based on my elevated position in life has given rise to me rethinking the longevity requirements of a tool. This thought was both depressing and liberating at the same time: Do I need a tool to last more than 30 years anymore? Hmm — it's something to think about.

Metal shears

Are you having trouble cutting thin-gauge sheet? It's likely due to cheap or worn-out shears. The pivots tend to loosen with time, causing the blades to misalign and make your cut rough or off track.

I have two small German snips, and three different styles of larger, American-made, Wiss aviation shears for cutting large sheets of aluminum and other nonferrous and ferrous metals. When purchasing aviation shears, be aware that they come in straight cut, straight and left cut, and straight and right cut. I suggest you buy one straight and left and one straight and right in an offset style **[1a]**. Tin snips **[1b]** cut straight, but you run into problems when cutting thick and wide sheets.

I also use a Pepe 12-in. (30.5 cm) bench shear and a 24-in. (61 cm) Di-Acro bench shear; both are guillotine style. My Beverly Throatless Shear is a bench shear similar to the aviation shears, but can cut in any direction; it's mostly used for large-scale projects. But, my favorite shear is the Roper Whitney hand notcher. This baby cuts perfect 90° notches in sheet; it's great for small-box construction.



Files

Files are the most misused tools by beginners as well as old timers. Air filing is as useless as someone "playing" air guitar. Both are a waste of energy and neither produces the desired results. Holding a piece of metal in one hand and filing with the other while talking to your buddy is not filing; it must be a deliberate and conscious act. Hold the piece you're working on firmly against a bench pin, in a ring clamp, or in a vise when filing. When using a large, flat file, clamp your work to a bench or hold it steady in a vise. Hold the tang or handle of the file in one hand, steady the tip of the file with your palm of your other hand, and file across the work. Large files should have a handle for extra leverage and safety.

Files should be kept from banging against each other; they dull. Also, a new file does not cut as well as a slightly used one. Not all of the teeth of the file are of equal size after manufacturing; with use, the tall teeth will break off and the file will start to work better.

Files come under the banner of "Purchase the best you can afford." Cheap files are cheap files. German- and Swiss-produced files are the best. At one time the American company, Nicholson, sold files in over 40 countries, but no longer. If you find NOS (new old stock) Nicholson files, buy them. The same goes for Stubbs, an old British file manufacturer. I cherish my remaining #4 half-round Stubbs. Don't throw away your worn-out files; they are great for making small tools or knives.

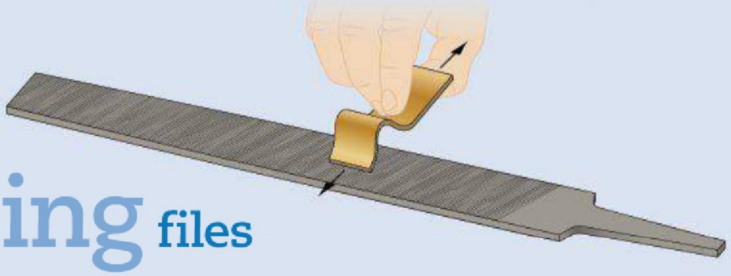
What was I waiting for?

There are also tools you thought you didn't need, or got along without during your whole career. Case in point: A friend of mine had been talking about the Lucas LowBoy foot control for the flex shaft; I've always used the original plastic unit that came with the flex shaft. I finally ordered a Lucas last year, and "Wham! What was I waiting for?" They are great: cast-metal construction, small, the ability to start and run at very slow RPM, and made in Brooklyn, New York, USA. The quick-release handpiece is another "WWIWF" tool.

I also never owned a tapered bracelet mandrel or a necklace mandrel; UPS has corrected this oversight. How did I get along without these tools for 40 years, and do I really need them? They're shiny and look so new. I can't wait to show them to my great-nephew the next time his dad brings him over. The bracelet mandrel looks like a cannon. He'll like that. AJ

Christopher C. Darway can be reached via email at darway design@earthlink.net.

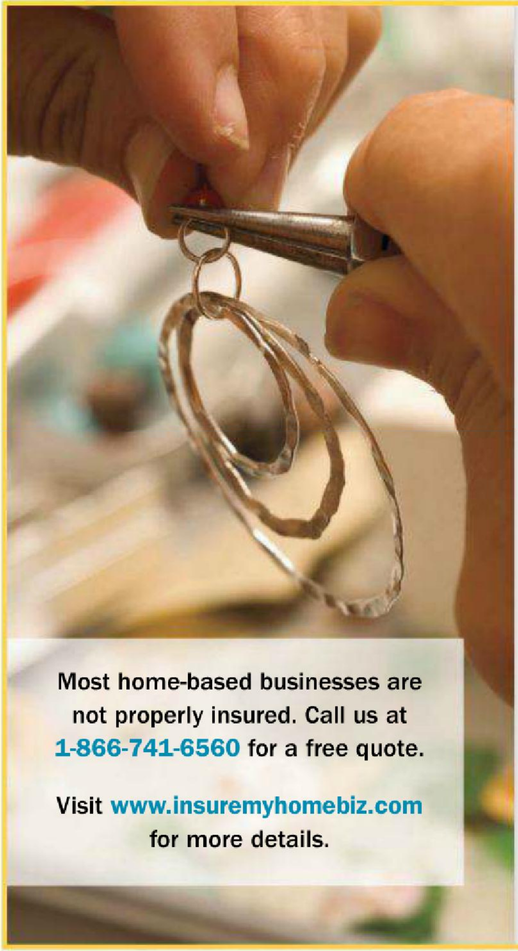
cleaning files



To prevent the teeth of your file from clogging when filing soft metals, such as copper and aluminum, rub chalk on the file teeth before filing, and clean your file with a file card or stiff steel-wire brush when you're finished filing for the day.

You can make your own flat file cleaner from a ½ x 3-in. (13 x 76 mm) piece of 18-gauge (1.0 mm) brass. Put a bend in the brass strip for your finger, and push back and forth in line with the cuts of the file to establish fine grooves in the end of the strip.

Alternatively, I use an ultrasonic cleaner to clean finer files. Make sure the cleaning solution is fresh and hot, and don't let the files touch the bottom of the cleaner tank. You will see the particles jump out of the files' teeth. Immediately pat the files dry while they are still warm. This helps to drive off any moisture and prevents rust. Then, coat the files with a thin coat of oil, kerosene, or WD-40.



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Security in Your Studio

by Marlene Richey

Security should be a major issue for everyone in the jewelry and beading world, no matter what materials you work with, be it paper and clay or diamonds and gold. If you sell your work, your studio — whether it's in your home or whether it enjoys its own location — houses your livelihood. It makes sense to do everything you can to safeguard it. The very nature of the work you produce makes it more likely that you'll be targeted for theft than those who work in other media.

Be a realist, not an alarmist

To assume that you're viewed as a rich potential target by thieves isn't being alarmist — it's just being realistic. Jewelry is a craft and art, but it is also a commodity, and herein lies the problem. Jewelry is automatically assumed to be valuable. And the highly educated jewel thief who can sift through a case full of stones and select only the most valuable ones is largely an invention of Hollywood. The majority of people out there really don't know the difference between silver and platinum or cubic zirconia and diamonds by sight; they just hear the word "jewelry" and see dollar signs. It doesn't matter what medium you work in, either; in one of the most recent jewelry-theft stories I ran across, the target was a polymer artist.

No matter the intrinsic value of your work, whether it's $100,000 or $1,000, your work has artistic value and is highly important to you. If you lose your jewelry, you're losing more than the cost of your materials; you're losing its potential income value and the time and effort you put into producing the work. And if your studio is targeted, you're also at risk of losing your tools, which would be disastrous in terms of preserving your livelihood.

If you're working in the jewelry industry, security concerns are omnipresent — in the studio, traveling to see clients, doing a show, inviting someone into your shop, working with employees, shipping orders, and receiving materials and supplies. It is always a part of daily routine.

Thinking about that daily routine, it's a bit nerve-wracking to realize all the points of contact you have with a potentially hostile and sticky-fingered audience. If you take your jewelry into a gallery to show it, as you leave the gallery's premises you are a potential target. If you show people your studio, you set yourself up as a potential target. When leaving a craft show where you have exhibited your entire line, if you host an open studio event, when you go to the post office, if you open the door to someone you don't know, you are a potential target.

All of these potential risks can be overwhelming. So how do you survive as a jeweler with your nervous system intact? The trick is to counteract all of these risks with some simple steps. By being aware of the risks and making basic security precautions and procedures a normal part of your daily routine, you can actually worry less. It's sort of like driving with a seat belt. By reducing your risk, you ensure you aren't a target with a bright red bull's-eye on your back.

shopping for insurance

When shopping around for jewelers block (which covers virtually anything that can happen to you, from fire to theft), a supplement to your current homeowner's plan, or one of the plans available for craftspeople, make sure to:

1 Work with a reputable company, preferably one that understands the peculiar logistics and nuisances of the jewelry world.

2 Don't sign up to pay more in premiums in a year than your jewelry is worth. Figure out how much merchandise you have, your inventory, and materials, and decide how much coverage you need as well as how much you want to pay to cover it.

3 Find out exactly what is covered and what isn't. Most of the time, replacement value is not the wholesale price of a piece but the cost of the materials and labor (aka "cost of goods sold").

4 Clarify with your agent exactly what you need to do to qualify for a policy. Some companies may require you to get a safe (of a minimum size), have a rated alarm system, or work outside the home. If you work with a torch, make sure that's okay. Go into details with your potential insurance company; you don't want a nasty surprise if you do need to collect on your policy.

5 Get more than one quote.

Isolate your work space. If you work at home, set aside a designated area to do your work. Whether it's a craft room or a full jewelry studio, you should be able to close it off from the rest of your home so that casual visitors don't have access to it.

Use the post office. Get a P.O. Box, and have your mail and packages delivered there instead of to your address. A high volume of packages, especially insured packages, attract attention.

Check your recipients' addresses. Don't use "jewelry," "gold," "gems," "silver," or other words that denote precious metals in the address of retail stores. If you're sending pieces to a place called "Bob Smith's Gold and Diamond Store," address it to "Bob Smith's Store" instead. If you're extra cautious, address the package "Attention: Bob Smith." Or, call the store to get an alternate name to use.

Choose your company name carefully. This is related to the previous point. If you haven't already given your company a name, name it something that doesn't include jewelry, gold, silver, etc. Stick to words like "designs," "collections," or "studios." If you've already named your company, be circumspect about how you label your mail. Instead of broadcasting "Marlene's Gold Jewelry" on your envelopes, try "MGJ" instead.

Install an alarm system. It can be as simple or complicated as you have money for, but you should have some kind of alarm system.

Buy a safe. But don't buy one that bad guys can pick up and walk out with; that defeats the whole point. If you do buy a portable safe, make it non-portable by bolting it to something solid.

Meter out your materials. Only take out materials you will be working with that particular day; keep the rest secure.

Use your locks. This should go without saying, but you might be surprised. Lock your house and studio when you leave and at night. If you're working alone, make sure the door is locked.

Stay alert. Be cautious about unknown people hanging around, incongruous or unexplained calls, and anything that feels out of the ordinary.

Keep a low profile. If your studio is visible from the street, keep your shades pulled. There's no need to advertise that you work on small, shiny objects.

Make the rounds. Do a check of windows and doors regularly, say, once a month. Make sure seals are intact, and that locks are functioning. Repair anything that is not working properly.

insurance contacts

Here are some companies that could be great resources for your insurance needs:

Michael Bergstein at **Erich Courant & Company** specializes in the jewelry business and knows it well; his daughter is a jewelry designer. He says, "A safe and alarm system are highly recommended but not required" to have a policy with him. He has designed a policy that will fit the needs of most jewelers.
jewelrydesignerinsurance@erichcourant.com

Fractured Atlas specializes in the arts in all media. They will custom-design a policy to meet an artist's specific needs and requirements. Emily Gray, the program director, states that all craftspeople need to consider not just their finished products but the raw materials and tools they have on hand.
support@fracturedatlas.com

Jewelers Mutual has been an integral part of the jewelry industry for a long time and is the insurer for all the big names. They know the jewelry world. They write "jewelers block" policies, and also recently created the "craftsman" policy, which is specifically designed with the independent jewelry craftsperson in mind.
www.jewelersmutual.com

All of these companies are well-respected; you have to decide which is best for you. They all provide strong education and advocacy for the artisan and jeweler, not just about insurance but about the jewelry world as a whole.

Maintain an inventory list. Keep an accurate and up-to-date inventory list. The cost of metals is constantly rising, so if you work in metal, keep track of not only the value of the piece at the time it was made but also the weight of the metal you used to make it. Keep a visual record of all of your work, even if it is a photocopy, so that you have a record of what you have made and own. Keep a copy of your inventory list off-site, just in case.

And remember, there's more to your business than your jewelry. There are the raw materials, tools, equipment, and office equipment. Make sure you inventory that as well.

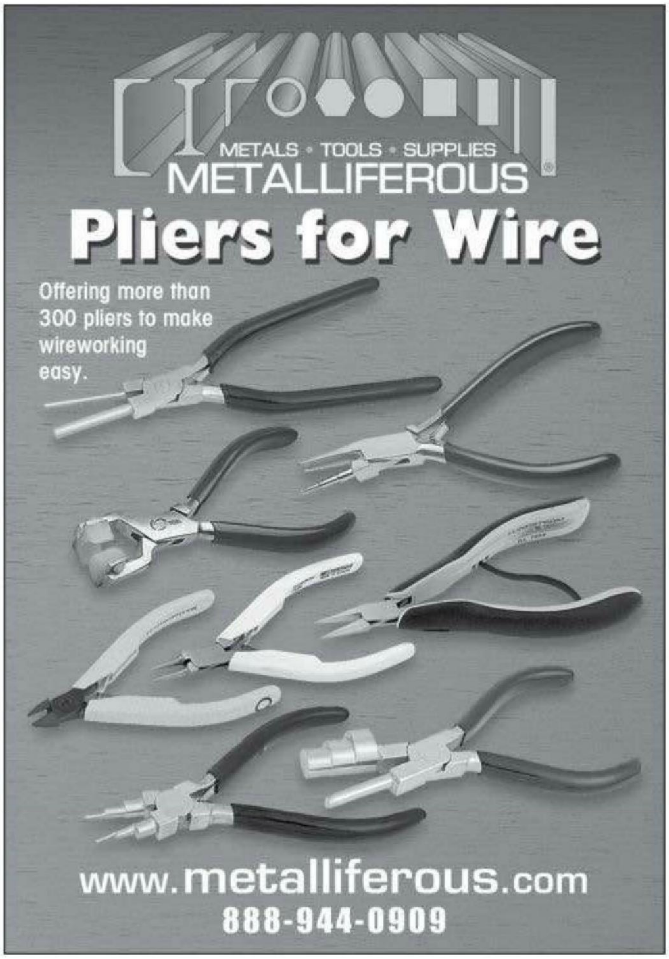
Don't be a hero. If you do get robbed, hand over your jewelry. Don't fight. Your life is not worth some jewelry.

Buy insurance. Whether you buy an insurance policy from a jewelry- or craft-specific company, or supplemental insurance for your homeowner's policy, make sure you're covered. (See "Shopping for Insurance," *opposite page*, and "Insurance Contacts," *above*.)

For all that reading this list of precautions may have raised your anxiety level, the truth is that actually *taking* the precautions will lower it again. It may seem like doing regular rounds of your studio and checking that the doors and windows are secure is a recipe for paranoia, but think about the famous, "Did I leave the stove on?" question. It's the things that you *don't* check that you worry about; taking the time to double-check means that you can then put it out of your mind and you won't be up at night wondering.

The most important thing to remember is that by being proactive about your security you are, in essence, ensuring that you have done everything humanly possible to protect yourself, your jewelry, and your studio. The rest we have less control over.

In her more than 30 years in the jewelry business, Marlene Richey has run a wholesale business and a retail gallery. She can be reached at marlenerichey@gmail.com.



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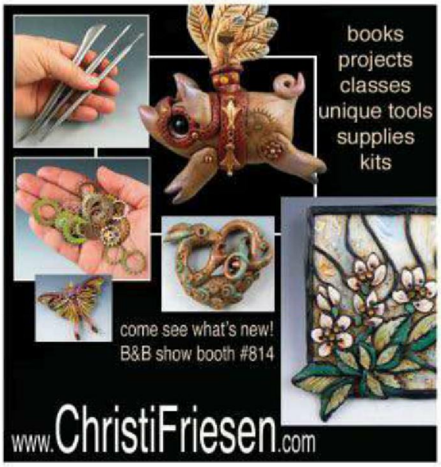

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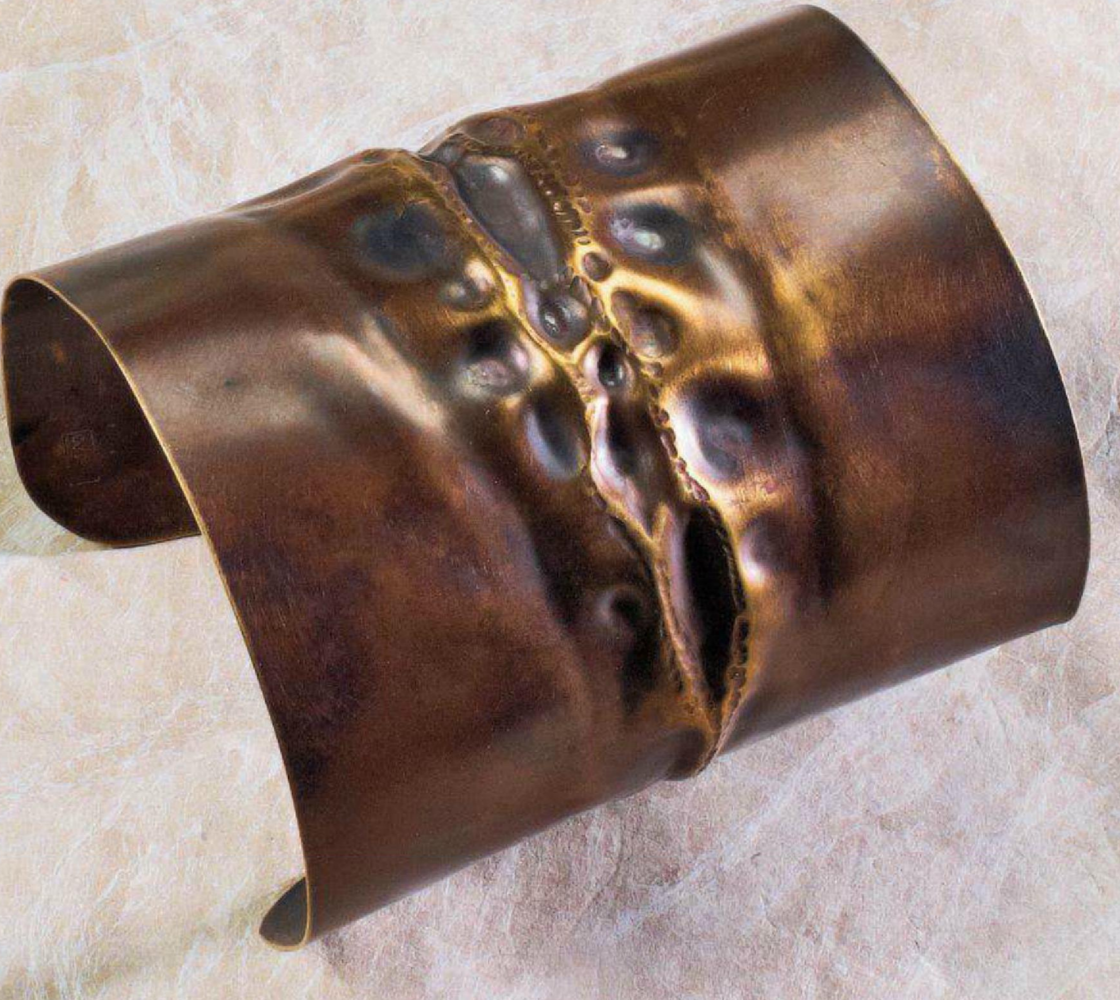
AIR CHASING



Take the **pitch** *out of chasing:*
Apply **foldforming techniques**
to create an **organic effect** *on metal.*

by Wendy Edsall-Kerwin

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	🎥
Annealing metal	●	●
Pickle	●	
Basic sawing of metal	●	●
How to file		●
Sanding	●	

B Basics, *page 82*
🎥 Videos, www.artjewelrymag.com/videos

ONLINE EXTRA

- Learn about the types of sealants you can use in jewelry making at **www.artjewelrymag.com/reference.**

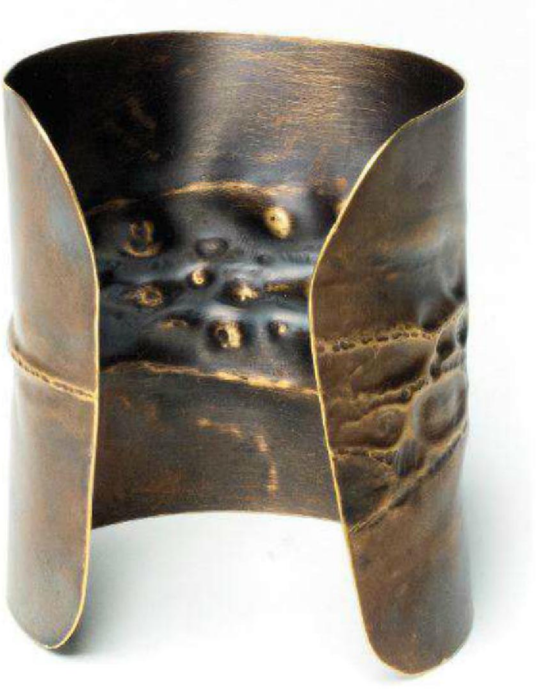
YOU MAY ALSO LIKE

- Chasing Beauty (March 2005)
- Foldform Mini Copper Stars (January 2011)

Where to buy: 800.533.6644,
www.artjewelrymag.com/store

Traditional chasing and repoussé techniques date back to the Bronze Age. With such techniques, the metal is set over a material, such as pitch or wax, to support the metal and keep it in place while it is shaped with various tools. Precise and intricate designs can be formed this way, but it is time consuming and hard on your hands, and it can get messy when you are working with pitch. I find it too impractical to use in much of my work.

It turns out that the man who invented foldforming, Charles Lewton-Brain, also developed a faster way of chasing — chasing over air. Instead of using pitch, you use the work-hardened areas of your metal to support your form while you chase it. Lewton-Brain says that you can achieve designs just as precise as those made through traditional chasing, but I find that chasing over air lends itself to producing more organic and free-form designs.



materials

- Nonferrous metal sheet: 28–22-gauge (0.32–0.6 mm), dead-soft

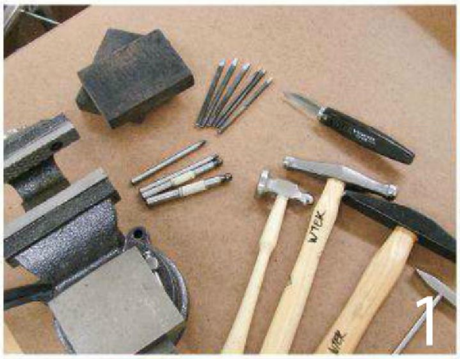
toolboxes, *page 85*

- Hammering
- Finishing
- Soldering

additional tools & supplies

- Chasing tools
- Dapping punches or sinking hammer
- Raising or riveting hammer
- Bench vise with grip covers or Delrin blocks
- Bench knife
- Metal shears or jeweler's saw with appropriate size blade (optional)
- Bracelet mandrel (optional)

Find out where to buy supplies, *page 87*
See Safety Basics, *page 84*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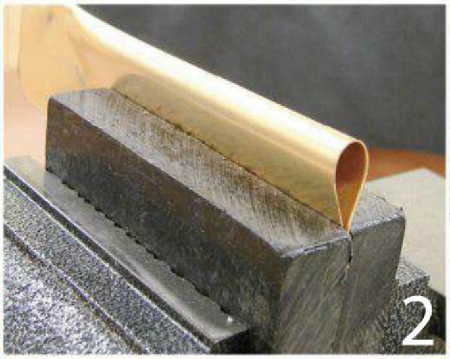
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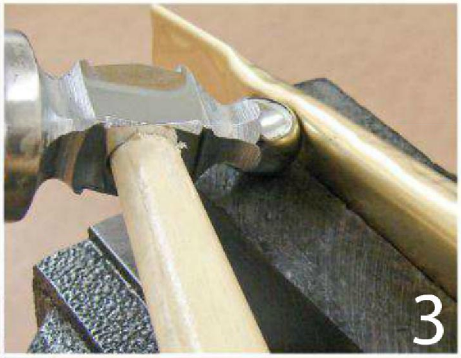
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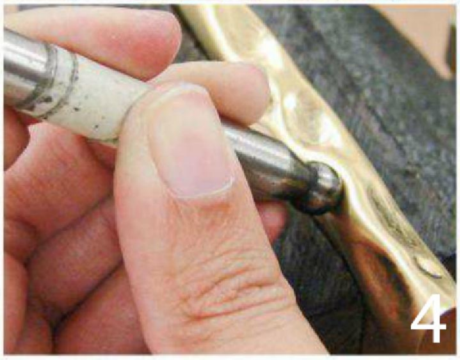
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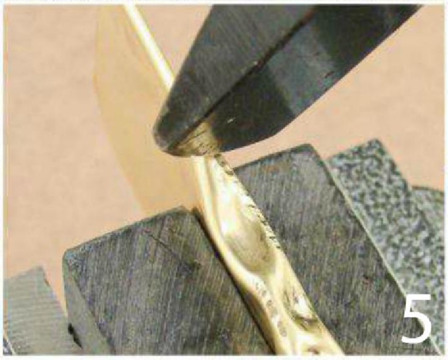
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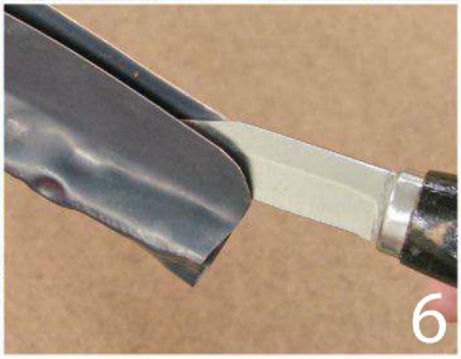
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Process photos by Wendy Edsall-Kerwin.

Your tools

You can use various tools to chase your piece: chasing tools to create texture or more complex designs; dapping punches, a sinking hammer, or the ball peen of a chasing hammer for rounder, more organic shapes; and raising or riveting hammers for texturing the ridges **[1]**.

You will need a bench vise to hold your metal while you work it. If you do not want a texture on the legs of your metal form, cover the jaws of the vise with metal sheet, or use Delrin blocks.

Forming the metal

Use metal that has been annealed, or anneal B ▣ the metal before you begin. I buy dead-soft metal and then anneal it as necessary. Form your metal sheet into a T fold, wedge fold, or boat fold (see "Foldforming," *opposite page*). These shapes create the air cushion you will use to form the metal. Place the legs of the folded metal into the jaws of your vise, and tighten the vise so the metal cannot shift.

NOTE: I am using a 3 x 6-in. (76 x 152 mm) piece of 24-gauge (0.5 mm) red brass in a wedge fold for my sample **[2]**.

Chase the metal. Slightly flatten the loop of metal using a rawhide or plastic mallet. Use a chasing hammer (or a large dapping punch) to get some initial shapes into the sides of the metal form **[3]**.

NOTE: It is important to start with the sides of the air cushion close to the vise to slightly work-harden the metal and give your form support, otherwise your air cushion will flatten too fast.

After forming the initial pattern, use chasing tools and punches in different sizes to create diversity in the pattern. As you work, ridges will begin to develop between the dapped areas **[4]**.

Add details and texture. Use chasing tools or the cross peen on your raising or riveting hammer to add different textures and/or details to your piece. I like to hammer across the ridges, creating a lacy pattern throughout the piece **[5]**.

Anneal the metal. If your metal becomes too work-hardened, or if you are done chasing, you will need to anneal your metal to soften it again. Quench the metal, pickle it B to remove any oxides, rinse it, and dry it. Once the metal is annealed, you can continue to chase it or you can begin finishing your piece.

NOTE: When you pickle your metal, make sure that the pickle doesn't get trapped in any tight spaces; acid will eat through your metal over time. To prevent this, rinse and dry the metal thoroughly.

Finishing your piece

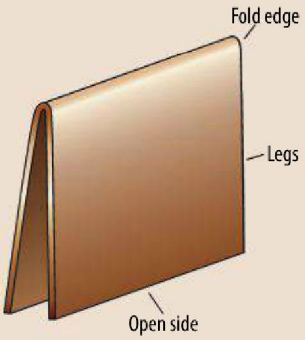
Open the metal. Once you are satisfied with your chased pattern and have annealed your metal, you will need to open it back up. Pry apart the edges of the metal using your fingers or a bench knife (see "Making a Bench Knife," *page 42*) **[6]**. Once the edges are pried open, use a mallet to continue opening the metal, and flatten it carefully onto a piece of wood or your workbench **[7]**.

foldforming

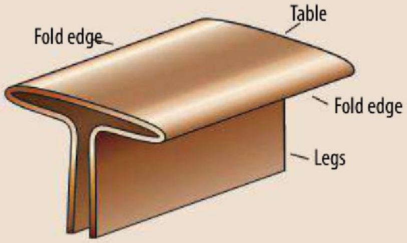
Foldforming is a technique in which metal sheet is folded, worked with tools, and then unfolded. Developed by Charles Lewton-Brain about 30 years ago, foldforming focuses on using the inherent characteristics of metals to quickly form the metal into 3-D shapes with gorgeous textures.

The basic folds used in foldforming are:

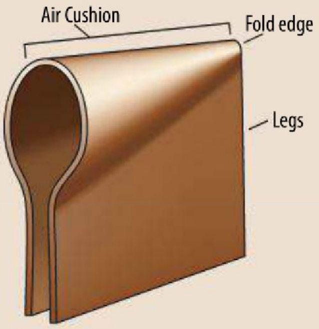
- **Line fold:** A flat fold, like creasing paper. This fold cannot be used for air chasing, because it forms no air cushion to work with.
- **T fold:** A cylindrical loop of metal. If you were not using this fold for air chasing, you would flatten the loop against the vise to form a "T" shape, which gives this fold its name.
- **Wedge fold:** An angled T fold, where the loop looks like a cone instead of a cylinder.
- **Boat fold:** A cigar- or boat-shaped cone, this fold is made using a double wedge fold. Form a wedge fold, then turn the metal and form a wedge fold on the other side.



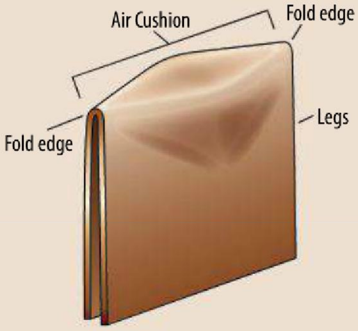
Line fold



T fold



Wedge fold



Boat fold

Shape your piece. You can use your chased metal for whatever you want. I turned mine into a cuff by forming it over a bracelet mandrel with a mallet **[8]**. Keep in mind that forming the metal like this will flatten the pattern slightly, especially if you are using copper. An alternative is to cut up your chased metal with metal shears or a jeweler's saw B ▣ and use it as a component in other pieces, like earrings, pendants, or rings.

Finish the metal. Once you've cut and shaped your piece, finish it by filing the edges ▣, sanding it B, polishing it, and sealing it ▣ with a microcrystalline wax. I chose to use a heat patina and buffed the high points of the pattern to create a nice contrast. AJ

7

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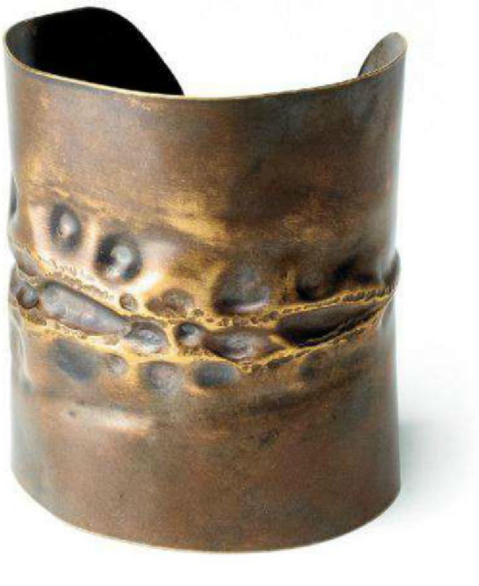

Wendy Edsall-Kerwin
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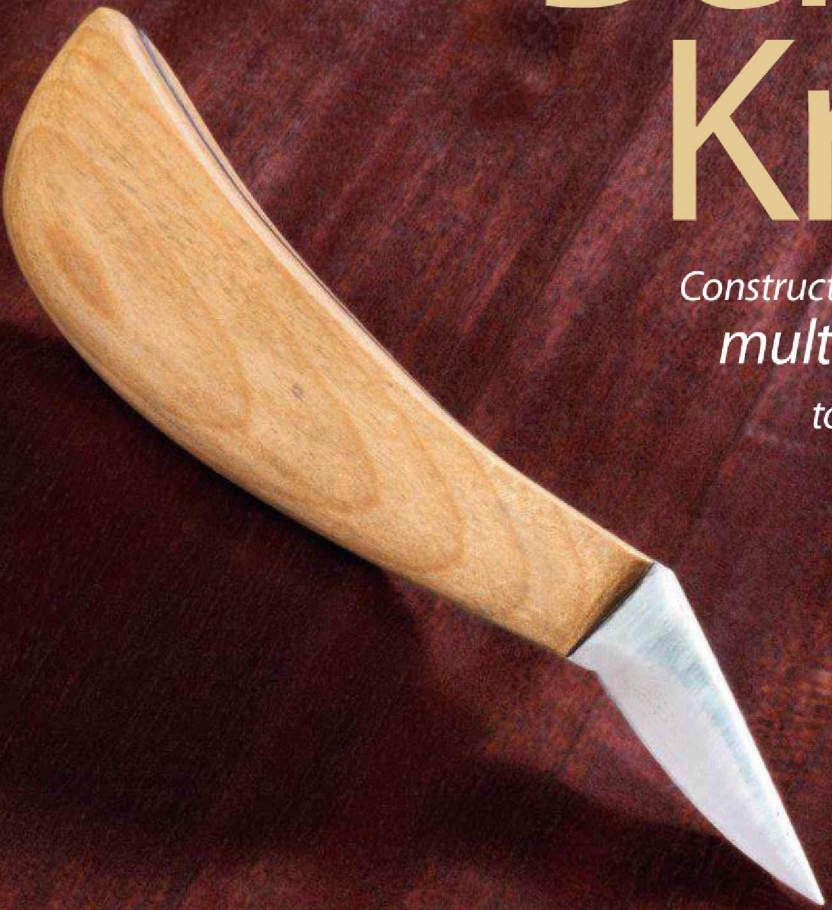
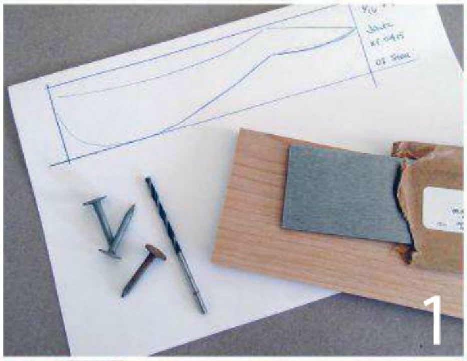
How to Make Your Own Bench Knife

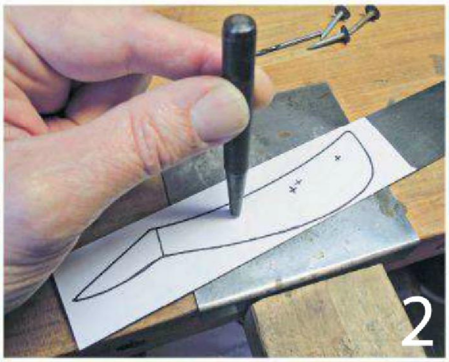


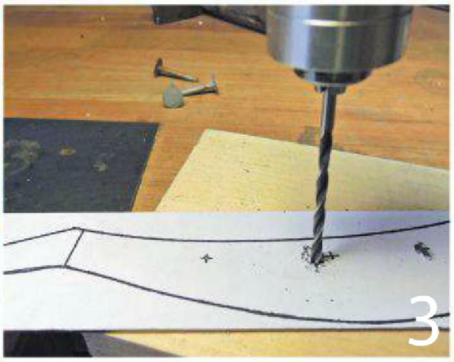
Construct a customized multipuprose tool to fit your own hand.

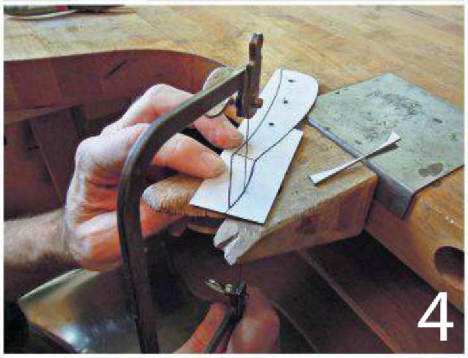
by Tim McCreight

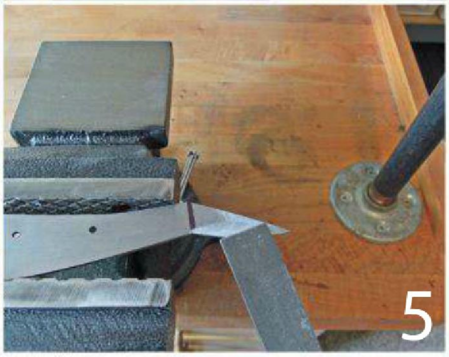
We're all familiar with X-ACTO knives and similar brands that are grouped together under the name of "craft knife." They are ubiquitous and, of course, they're handy, but what came before them? Tradesmen of years ago had a similar all-purpose knife, and there was a good chance that they made it themselves. This is one of my favorite tools to make and to use — in a compact form, it contains everything I like about tools. A bench knife is functional and tailored to the individual craftsman. There are dozens of styles and thousands of designs, but for this project we'll choose one to take us through the basics. If you're like me, you'll start here, then make more to suit your personal taste.











Cutting the steel

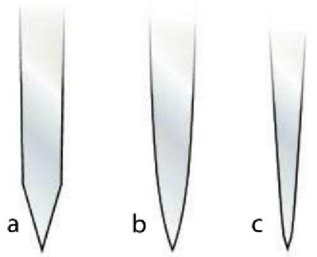
Draw the silhouette of the knife. The style I'm showing here is called a "full tang knife," which means the steel runs the entire length of the knife. This takes more steel than other styles, but it is the strongest. Once you have a design you like, transfer it onto self-adhesive paper (aka label paper) **[1]**.

Clean the steel. Sand the surface of O1 carbon steel with sandpaper and then rinse it, or wash it with soapy water. Dry the steel and then stick the paper onto the steel.

Drill the pin holes. We could simply glue the wood onto the steel, but there's a good chance that a glancing blow would knock the pieces off. To provide a stronger connection, we'll add a couple of hidden pins, and we need to drill holes for these. It's safest to drill these holes before sharpening the steel. Bearing in mind that the handle will be thin near the bottom, place three marks near the spine of the knife. Use a center punch to make divots at the postitions you've chosen **[2]**, then drill **B** 🎥 **[3]** a 1/8-in. (3 mm) hole at each divot.

Saw out the steel. Cut out the steel with a jeweler's saw **B** 🎥 and a stout saw blade, such as a #4 **[4]**. Don't rush; let the saw do its job. You may be surprised how quickly this goes.

File the blade. Use a permanent marker to mark the place where the blade will emerge from the handle. Use a coarse file to file 🎥 a taper on the area that will be the blade **[5]**. To achieve a sharp edge, it's necessary to give the blade area a thin taper. The slope of the blade should be the same on both sides and should cover the entire breadth of the blade **[Figure,** *below***]**. When you get close to the final shape of the blade, switch from using the file to using coarse, then medium sandpaper on sanding sticks 🎥.



a) Filing a blunt angle at only the bottom edge will not yield a sharp blade.

b) This is better, but the blade is thick in its midsection and will never hold a razor edge.

c) This is the goal — a long taper that runs from the top of the blade to the cutting edge. It takes longer to achieve, but it is worth the effort.

materials

- O1 plain carbon steel: 1/16 x 1½ x 6 in. (1.5 x 38 x 152 mm)
- Flat wooden slab: roughly ½ in. (13 mm) thick
- Common nails: 3

(See "A Note on Materials," *page 44*)

toolbox, *page 85*

- Sawing/piercing

additional tools & supplies

- Label paper
- Sandpaper: various grits
- Steel can
- Oil (Motor oil, vegetable oil, olive oil, or peanut oil)
- Vise-grip pliers
- Torch
- Utility hammer
- Two-part, 5-minute epoxy
- Vise or C-clamps
- Mineral oil or linseed oil (optional)
- Whetstone

Find out where to buy supplies, *page 87*
See Safety Basics, *page 84*

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	🎥
Drilling through metal	●	●
Basic sawing of metal		●
How to file		●
Making sanding sticks		●

B Basics, *page 82*
🎥 Videos, www.artjewelrymag.com/videos

Tempering

The next step — a pair of steps, really — is to harden the blade, then remove the brittleness created in the hardening process to make a long-lasting blade. This requires heating the steel to the right temperature, then cooling it at the appropriate rate. There are entire books written about how to do this, but we'll make the process as simple as possible.

Prepare a container of oil. I use a steel can and whatever motor oil is cheapest at the neighborhood gas station. Something like 10W 40 is good, but almost anything will do. If you don't like the idea of petroleum, you can also use a vegetable oil, like olive oil or peanut oil. Of course, you won't be able to take it back to the kitchen when you're done here!

a note on materials

The materials you need to make a bench knife are a piece of tool steel, a couple of nails, and something for a handle. For the purposes of the project, I described store-bought materials, but depending on your circumstances, you might consider alternate sources. If you have access to a woodworking studio, for instance, your choice of handle materials will increase.

For a blade that runs the length of the handle, such as the one I made here, you need a 6-in. (15.2 cm) piece of steel. Since steel is typically sold in 18-in. (45.7 cm) lengths, you'll be ready for your next two knives before you even start on your first!

For the handle material, I bought slabs of maple at my local home-supply store. Anything can work, but soft woods like pine or poplar are not recommended, because they will wear out long before the steel. Fruit woods like cherry or apple are my favorite, but the hard maple I'm using here is also good. Starting with perfectly flat wood is a great advantage.

Harden the blade. Hold the steel in vise-grip pliers. Use your torch to heat the blade area of the steel to a uniform, luminous red **[6]**, then quickly plunge it into the oil **[7]**. Keep the steel in the oil for about 1 minute, gently stirring to prevent the oil around the hot steel from becoming too hot. Remove the steel from the oil, and wipe it with a paper towel.

To test the effectiveness of the hardening step, run a file along the blade. If it slides easily across with a high-pitched noise, you did a good job. If the file seems to bite into the steel, either you did not get the steel hot enough or the steel cooled before it got to the oil. Try again.

Temper the blade. At this point, the steel is hard but also brittle; if you tried to use it, the blade might well snap off. To prevent this, we'll remove some of the brittleness in a process called "tempering." This is nothing more than heating the steel to a specific temperature. Easy, right? We're lucky, because tool steel reveals its temperature through a consistent color display. To be able to see this clearly, use any grit of sandpaper to sand away the dark gray oxide created in the last step.

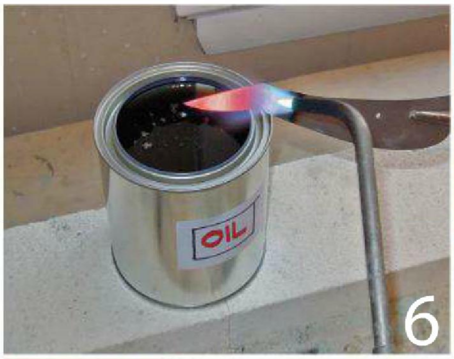
Hold the blade in vise-grip pliers, and warm it slowly with your torch **[8]**.

NOTE: The most common error in this process is to overheat the blade. Use a small flame, and be ready to quickly pull it away if the process is going too fast.

After about 30 seconds, the steel will bloom into a bronze-yellow. Focus the flame on the thickest part of the blade, pulling it away every few seconds to allow the heat to travel through the steel. The goal is to achieve a blue color on the spine and a pale yellow on the blade **[9]**. This is tricky the first time or two, but it will be fine if you take the entire blade to blue. When you get to blue, instantly plunge the steel into either water or oil to cool it.

NOTE: If you heat the blade too much at this stage, take a break, then repeat the process, starting with hardening the blade.

Clean the steel. Use soapy water to clean the steel, then sand it to remove the oxides. You can refine the surface of the blade to a high shine by moving through increasingly finer sandpapers, but that won't significantly increase the effectiveness of the knife. I usually stop at 320 grit.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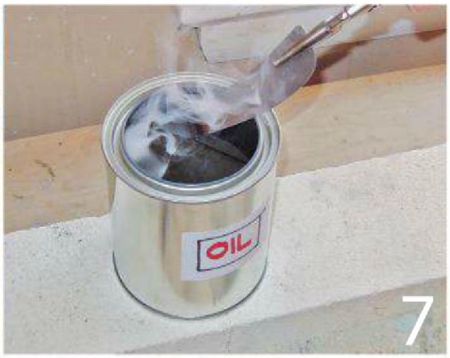
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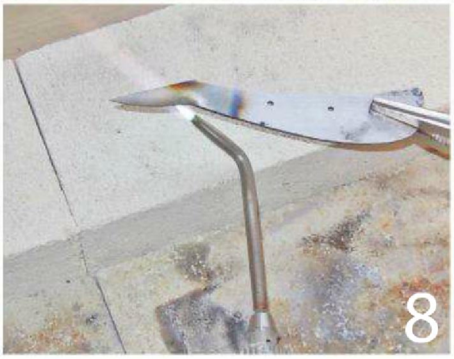
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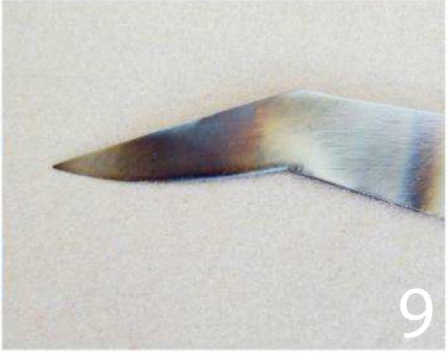
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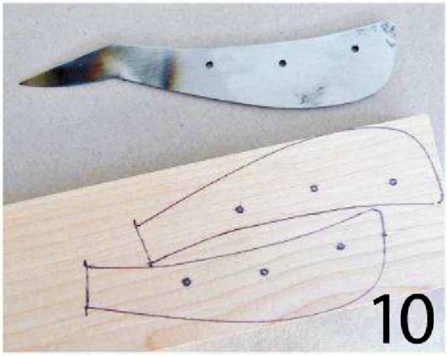
ONLINE EXTRA

Metal tutorial: How to Anneal, Harden, and Temper Steel
www.artjewelrymag.com/reference

Process photos by Tim McCreight.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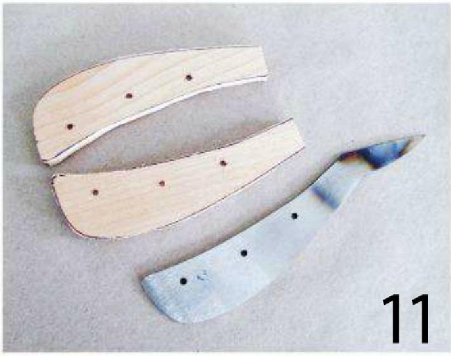
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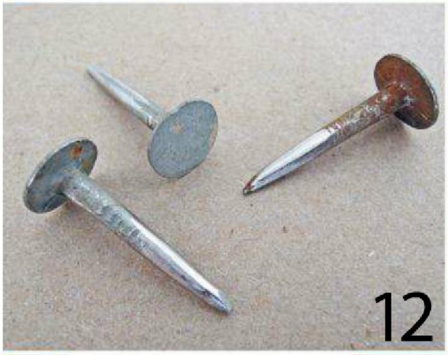
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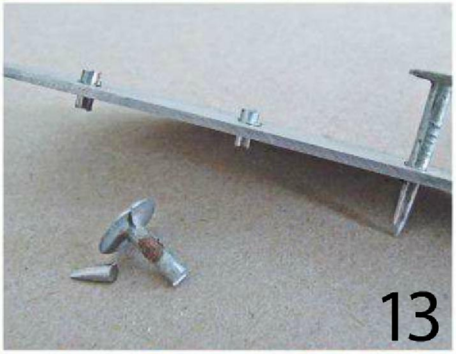
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DEVCON
5 Minute Epoxy
DEVCON
5 Minute Epoxy Hardener
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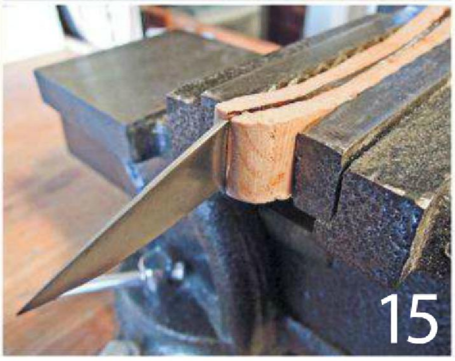
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Making the handle

Cut the handle pieces. Trace the steel twice onto the wood piece; be sure to mark the location of the holes in the steel on the wood **[10]**. (The two tracings should be mirror images of each other.) Saw out the two shapes, cutting a millimeter or two outside the lines. Using the same bit as before, drill shallow holes in the handle pieces at each mark **[11]**. Don't drill too deep at this point; the holes are just for basic alignment.

Make the pins. Select a common nail that is slightly larger than the holes in the blade. File the nail into a taper **[12]**, then use a utility hammer to drive it into a hole in the steel until it is permanently lodged there. Saw off each end of the nail so that about ⅛ in. (3 mm) extends on each side. This length will depend on the thickness and contour of your handle; if you have a thicker handle, you'll want a longer peg.

Repeat to set two more pins in the steel **[13]**.

Deepen the holes in the handle. Set a handle half against the steel so that the pins in the steel align with the holes in the handle. Check the depth of the shallow holes you drilled previously, then remove the steel, and drill to deepen the holes slightly. Be careful that you don't go too far — drill a little and try the fit of the handle piece against the steel to check as you go. The goal is to have the handle piece lie flat against the steel.

Once you've achieved this fit with one handle piece, repeat with the second.

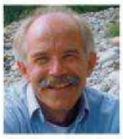
Set the blade. Use soapy water to clean the blade of all traces of oil, and dry it without touching the steel with your fingers. Mix up a portion of two-part 5-minute epoxy. Apply a generous layer of epoxy to the sides of the wood that will be attached to the steel; put a little extra epoxy in the holes that will secure the wood to the pins **[14]**. Press the handle pieces into place on the steel, and clamp the assembly in a vise **[15]** or with C-clamps. Allow the epoxy to dry thoroughly.

Shape the handle. Remove the C-clamps and use rasps, files, and sandpaper to shape and smooth the handle. This is simple to describe, but it could easily take as long as what you've done to get this far. Don't shorten the process by stopping before you have a handle that cries out to be held. This knife will be with you for decades, so make it right!

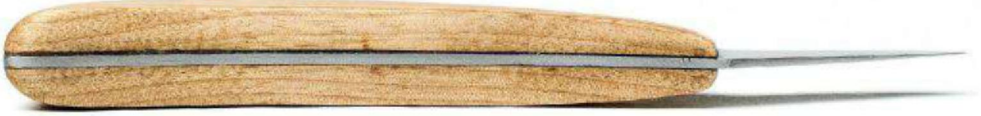
Oil the handle. If desired, you can oil the handle to treat the wood. I prefer to allow the handle to naturally acquire an oil finish through skin oils as I use it. If you choose to oil the handle, use mineral oil or linseed oil. Apply the oil with a soft, clean rag, and allow it to soak into the wood grain.

Sharpen the blade. Hone the edge of the blade on a whetstone.

Congratulations! I hope you and your bench knife will have many safe and happy years together. AJ



***Tim McCreight** Contact: www.brynmorgen.com*



In this style of knife, the steel runs the entire length of the handle, so the blade is stable.

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TOP TOOLS

OF TOP JEWELRY MAKERS

Ten jewelry artists weigh in on the tools they can't live without.

In the same way that all athletic advertisements feature professional sports all-stars, it's only natural that we look to successful and well-known jewelry artists in an effort to gain insight into their genius. "How do they do it?" we ask ourselves. More importantly, "How can *I* do it?"

To find some of these answers, we asked 10 top jewelry makers who work in everything from metals and metal clay to polymer and mixed media to share their favorite tools of the trade — whether those tools are commercially available, modified, or completely handmade.

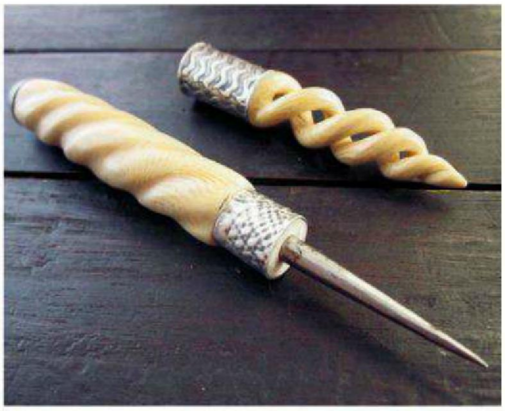
Arline **Fisch**

An electric rolling mill — I purchased it in the early '70s with an NEA Craftsman's grant and used it extensively in the '80s and '90s to roll small-gauge fine silver wire into flat ribbon for weaving and plaiting.

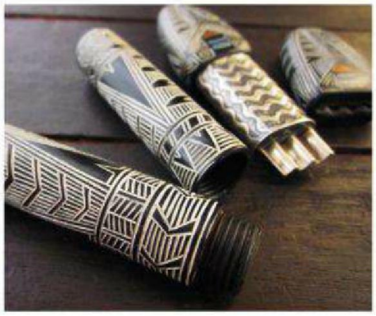
While teaching for a semester in Vienna, Austria, I was taken to visit an elderly goldsmith who was closing his shop and selling his tools. I acquired about 100 well-used **chasing tools** and several chasing hammers, which I still treasure.

Celie Fago

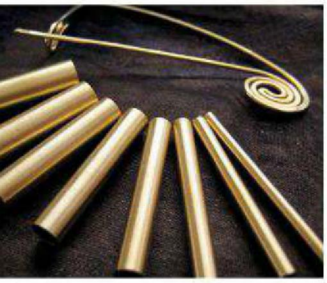
These are tools I use every day, for long hours at a time; why not enhance them; why not make them things of beauty if I'm going to be looking at them all day long?



Awl — I use this simple awl for classical loop-in-loop chain making. The repetitive motion of this activity is made immeasurably easier by having a larger handle to grasp. The handle is made of a faux-ivory polymer clay, and the closure is a friction fit made with roll-printed sterling silver.

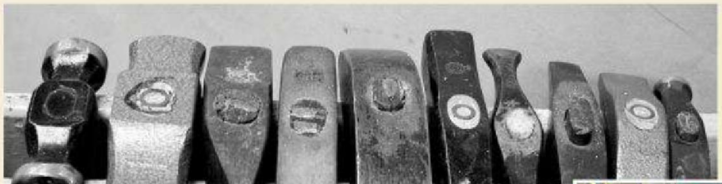


Black and white tools — These tools are polymer clay that were carved with a smaller Speedball gouge (#1). The one on the right is an impression tool, and the one on the left is a storage case for an assortment of small awls. It has a threaded cap that I developed in the '90s. I use these tools daily when working with metal clay.



Nesting tube set — I use this tool every day for cutting out circles, making holes, and stone setting in metal clay. The forged spiral pin keeps the tubes "nested" and collected in one place; an essential point if you've seen my studio! I developed the Nesting Tube Set in the late '90s and began selling it in 2000.

This **Speedball gouge** is one that my mother, a print maker and painter, used in the '40s. She gave it to me 35 years ago, and I have gotten more use out of it then almost any tool I own. Sharp Speedball gouges are no longer available to purchase. The new ones cannot be easily sharpened because of the shape and the angles of the edges.



Charles Lewton-Brain

I use a lot of **hammers** in different sizes and shapes. I do so much with them and in so many ways.

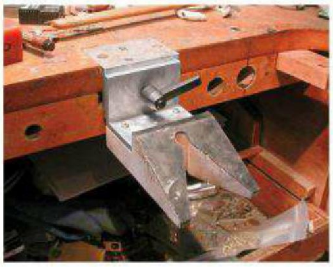
Flex shaft and all its attachments — When I studied in Germany, we were only allowed to use hand-operated bow drills. That makes you really appreciate a flex shaft!

Magnifying lenses — Hmm … could be age creeping in! In the same way that a surgeon or dentist uses magnification, it results in higher quality and more accurate jewelry work.

My brain — Thinking about things is one of the most important tools. It lets you use all others.

Chris **Darway**

Most favorite tool: My **bench pin design**. Made for die cutting. Jayne Redman uses these in her die cutting classes.



My **Roper Whitney notcher**. Killer tool, killer price. (To see more on this and other tools Chris Darway recommends, see "Studio Savvy," *page 32*.) When the proper hammer can't be found for the job, my **4 oz. ball-peen hammer** does everything from riveting, forging, punching a gasket, etc. I don't have guilty feelings about abusing the little guy.

My **Leatherman** tool gets more use than any other tool I own. It is a simple model (pliers, knife blade, screwdrivers, and ruler), but it's better than any Swiss Army knife. It has been used so much I had to braze a steel tab to keep the blade locking open.

Deb **Karash**

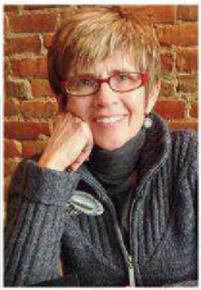
Badeco hammer handpiece — I learned about this tool from Andy Cooperman when I was taking a workshop from him. It changed the way I work! I like the option to customize the tips. I have one I use for riveting; it gives me the ability to rivet in tight places with almost no clean up. The other tip that I use nearly every day is one that I ground down to a chisel shape and I use it to carve texture.

Super flush cutters — I like my rivets to be completely flush on the back, and I couldn't do this without my super flush cutters. Swiss ones are the best, and they last a long time if you don't use them to cut steel or heavy wire.

Bench-top anvil — Being that I am essentially a bit lazy, I don't like to have to leave my bench to flatten a piece of metal or to rivet, so I have a really sweet old anvil that sits right on my bench. When I teach, it really comes in handy because I can demo everything right at the bench.

Bench-top buffer — It does everything that I need in a small footprint. It has a rheostat so I can control the speed, which is especially useful when buffing anything delicate. But I'd have to say that my favorite thing about it is that it allows me to take my entire studio, pack it up in the van, and go work anyplace that I can find about six feet of space to set up a table.

#2 half round file — I can file almost everything with this file. I like to use the largest file possible to avoid cutting into the edge, and also to save time.



Sarah Perkins

Rolling mill — I use it for flattening copper, fine silver, and gold wires for cloisonné. It's *much* less expensive to buy round wire and flatten it myself than to buy cloisonné wire. I also pour ingots with scrap metal and roll them out to usable forms. And, of course, I use it for roller printing and embossing.

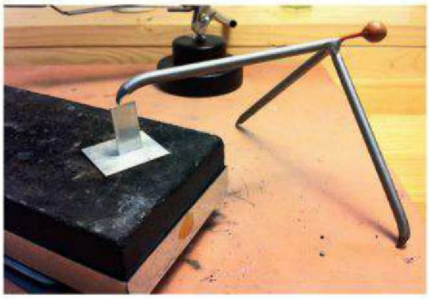
#4 hand file — I use it after coarser files and before sanding to refine a surface. I find it much easier to control and to keep a crisp edge with than sanding sticks.

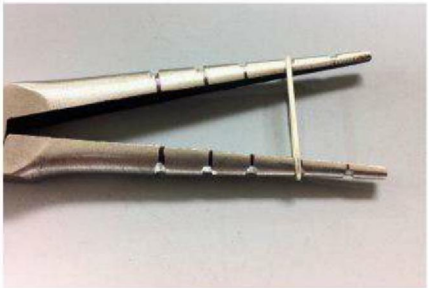
Ronda Coryell

Each leg of my **soldering tripod** is a different length, and the ball at the apex of the tripod determines which leg is heaviest. It is quick to set up and it doesn't use too much pressure or act as a heat sink. Thomas Mann gave me a similar one a few years ago. This one is a re-creation of that one.

My favorite **chasing hammer** was given to me by my mentor, Il Maestro Fabrizio Acquafresca. It had been given to him by *his* maestro when he graduated. It has amazing balance, spring, and weight, but most of all I love it for the story that it holds. I think of the history of the hammer and what it has created before me.

Pliers ($2) that I adapted for stretching jump rings. I used a separating disk to cut the grooves.





Cynthia Toops

A pair of **fine-tip tweezers** are perfect for setting my micro-mosaic components into place.

A **double-edge safety-razor blade** that has been broken in half. The thinness and flexibility of the safety-razor blade is perfect; unlike straight-edge razor blades, the safety razor is the same thickness from the edge to the top of the blade, making it easy to slice canes.

I use a household **sewing pin** for popping trapped air bubbles in polymer sheets, placing mosaic components into place, and laying out the mosaic design in uncured polymer clay.

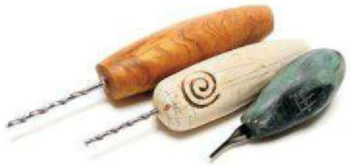
Tory Hughes

Jim Hughes knives — Thirty years ago, my father watched me work. He then found a pair of nice sturdy stainless steel table knives, filed and sanded the serrations off, and gave me a cutting blade with a sturdy handle that lets me trim accurate straight edges. I can also slide it under pieces so I can lift them easily, or push laterally against polymer elements to adhere them before baking.

Glass work surfaces — Because I often create surfaces with delicately applied effects, I fabricate pieces on glass squares, then put the glass into the oven directly, rather than risking distorting the piece when moving it from my work table to the oven. Working on glass is crucial because polymer and related media will never stick to the glass, and glass is rigid enough to be able to pick up and move around as I am working on the piece.

Pliers — Because I work in polymer and mixed media, I need tools that will interact across media. I use pliers for wire work, for holding various elements when gluing them, for making eye pins when I want to hang something, and for cutting wire for coils and attachments. The wrong pair of pliers is worse than having to improvise with no pliers.

Tool handles — Generic handles don't fit my hands well enough to give me the control I want, so I make my own handles for drills, carving tools, etc. Customized handles are especially important on my carving tools because I need to depend on a sharp tip that responds immediately to the actions of my hand.



Tissue blade — Flexible tissue blades let me create any silhouette in polymer that I like by bending it into smooth, even curves. There is no template or external guide that is as direct or inexpensive, or gives me as much control, as using my blade to make shapes. That they are thin and sharp is secondary to their ability to cut while flexing.

Clear straight-sided drinking glass — I couldn't work in polymer without this. I use it to make things flat, to shape curves, to create crisper textures, etc. I use it because:

- I can see through it to gauge its effect as I roll over something.
- Since I hold the tool itself, I have control, rather than having to rely on external moving parts.
- I can smooth, flatten, and shape polymer to any thickness, on any orientation.
- Glass does not interact with the plasticizer, so it lasts forever.

Marlene **True**

Klenk brand pipe cutters are excellent for dismantling tin cans, which I use a lot of in my work.

I love my **Starett dividers** because they are fantastic for measuring, transferring measurements, and layout work in general.

Swanstrom's #1 confirming pliers are excellent for making crisp bends in tin! AJ

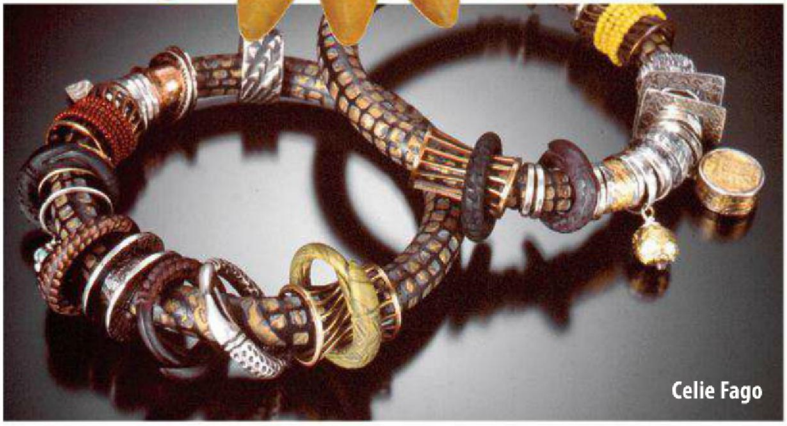
TOP TOOLS

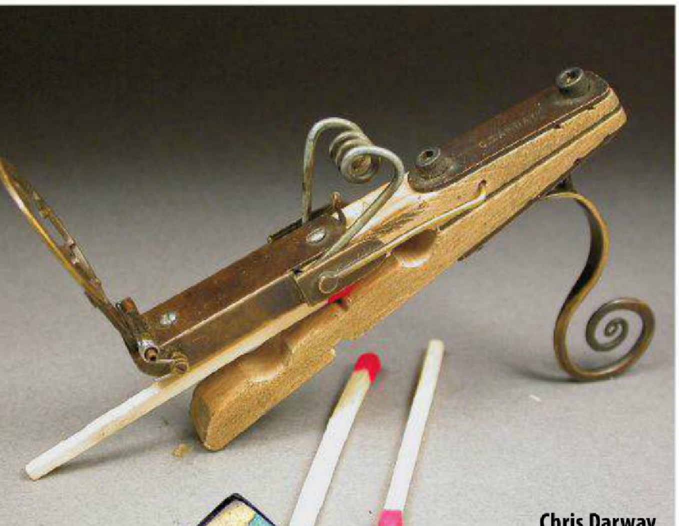
ARTIST GALLERY

Sarah Perkins

Ronda Coryell

Marlene True


Celie Fago


Chris Darway

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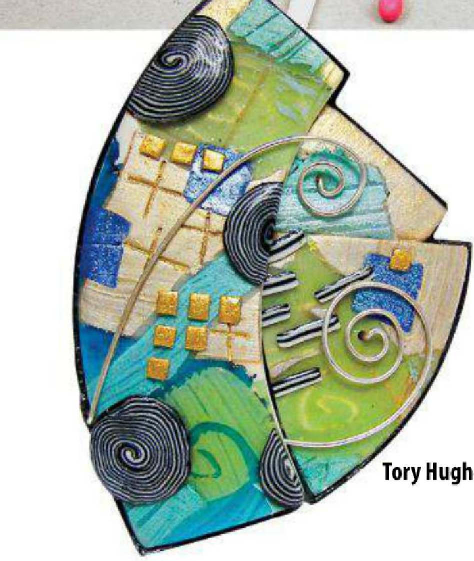
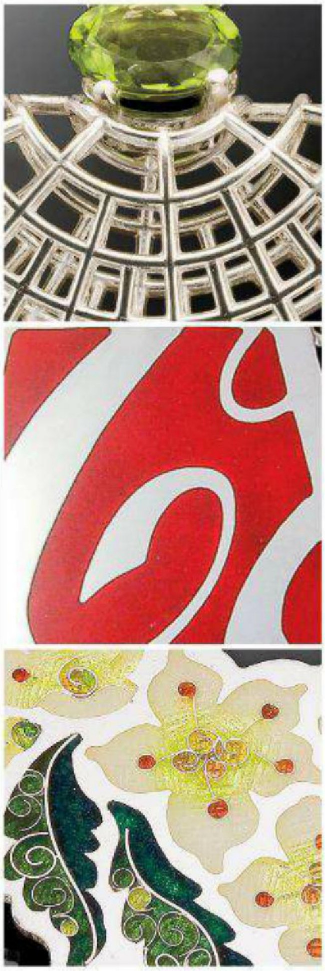

Tory Hughes

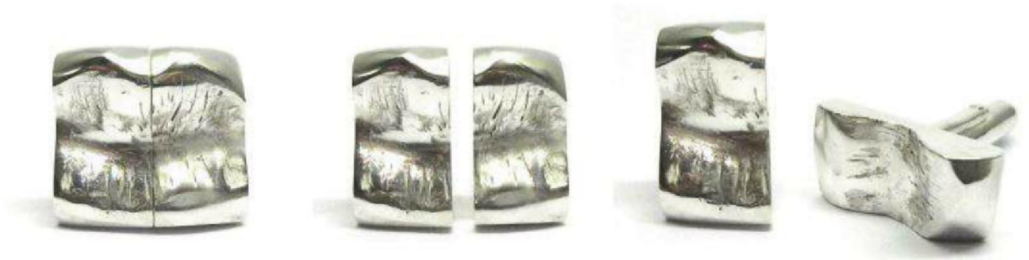
Arlene Fisch

Charles Lewton-Brain

GALLERY



Art comes to you
proposing frankly
to give nothing but
the highest quality
to your moments
as they pass.
—Walter Pater

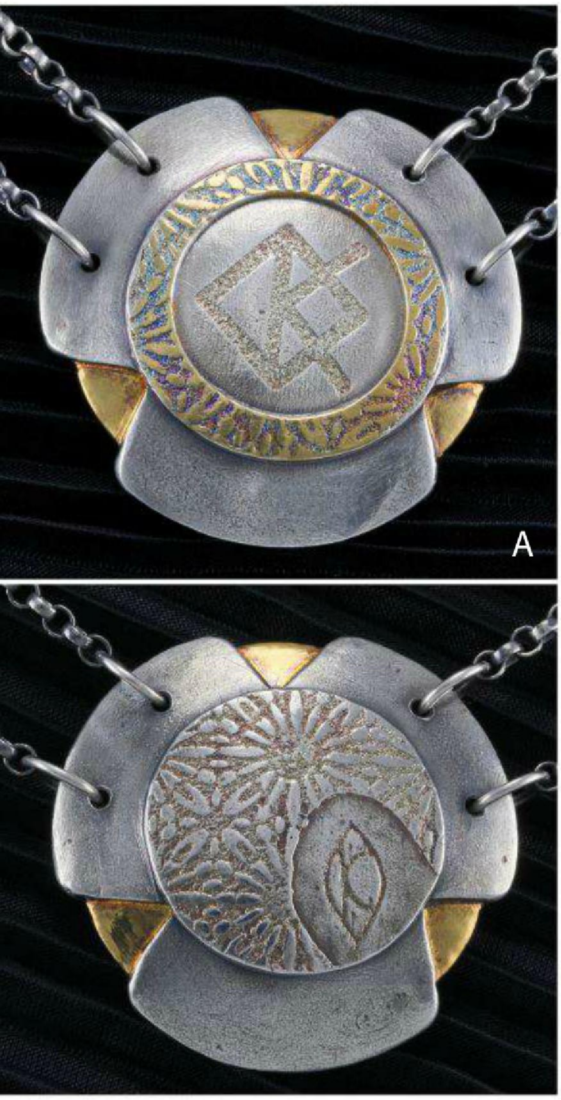


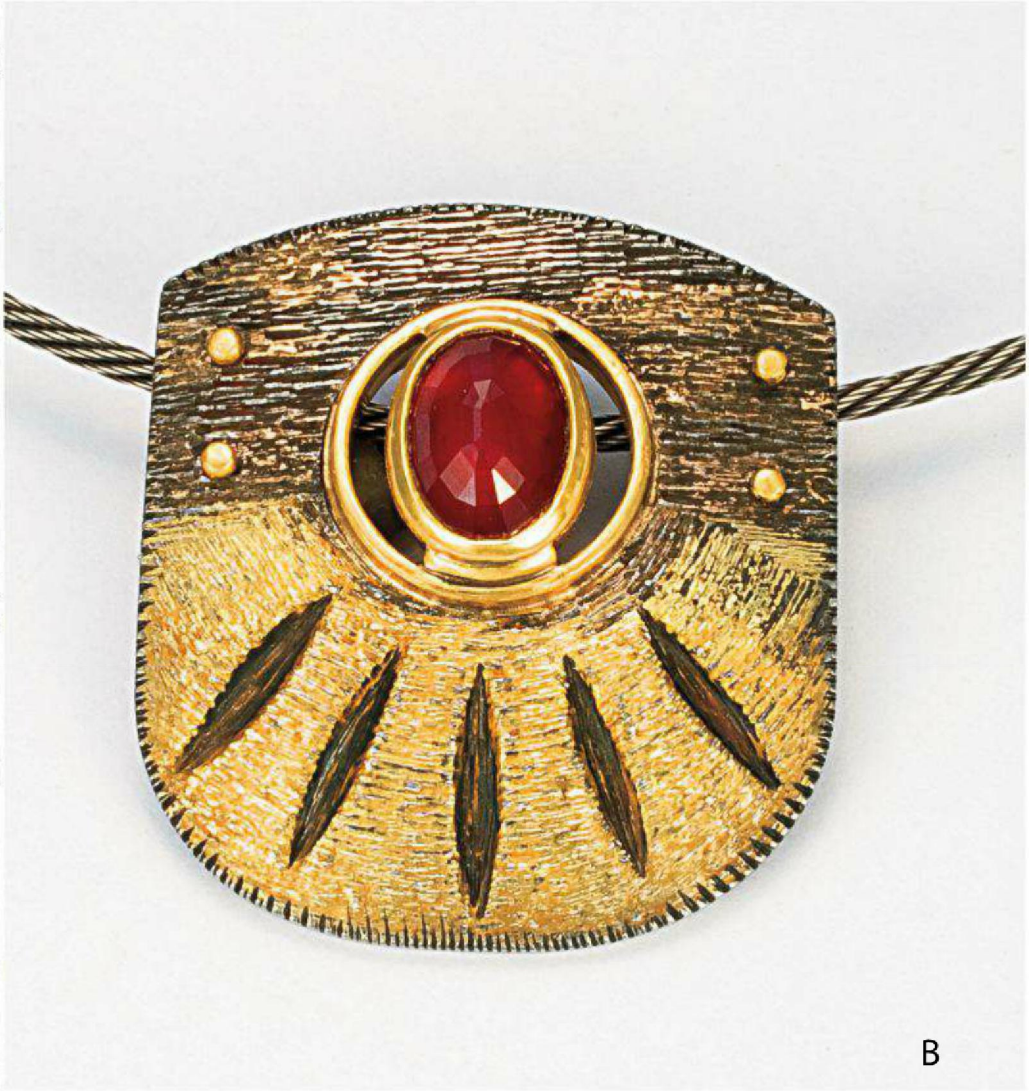
[Top and *page 53*] Kirstin Moore created *Kiss-Links* after a bride approched her with a desire to make cuff links as an engagement gift for her future husband. Moore cast the bride's lips in sterling silver, then cut the casting in two. Separated, the cuff links are abstract silver shapes; put together, they reveal a secret kiss. Each link is 1 x ½ in. (25.5 x 13 mm).

[A] *Talisman Creativity,* by **Karen Christiaens**, was inspired by early runes of central Europe. As letters combine to form words, runes combine to form bind runes. This particular bind rune is said to sharpen the wearer's creative focus. The pendant (shown front and back) is made of fine and sterling silver and 24k gold. 3.4 cm. diameter (1⅜ in).

[B] A few years after selling his *Urban-Armour 1* pendant, **Chris Nelson** knew he needed to make another to take its place. Drawing on his refined techniques of working with iron and gold, he created *Urban-Armour 2*. The pendant is made of iron, 18k red and 22k yellow gold, and faceted ruby. 1¼ x 1⅜ x ⅜ in. (32 x 35 x 9.5 mm). Photo by the artist.

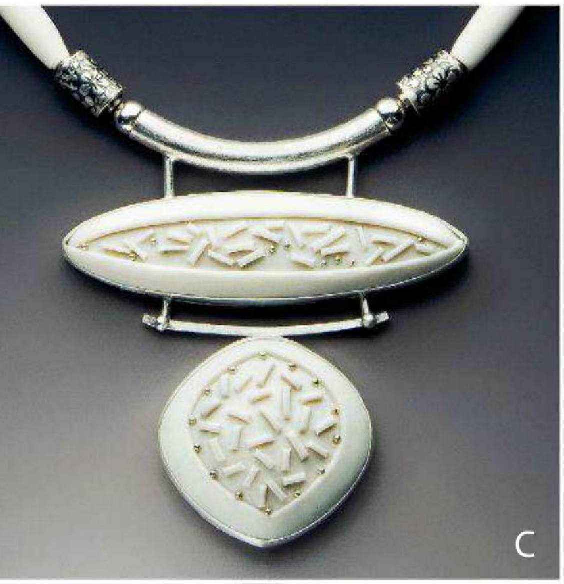
[C] The play of texture and shadow on white embossed paper intrigued **Grace Strokes** by being both bold and delicate at the same time. She recreated that same juxtaposition with her *White 'Embossed' Pendant*. The pendant is made of sterling silver and polymer clay. 2¼ x 2½ in. (57 x 64 mm). Photo by Kevin Olds Imaging.





[D] Liz Hall created *Inner Workings* to combine the distinctive qualities of mechanical and organic materials. The pendant is made of metal and polymer clay with iridescent mediums. **[E] Sandra McEwen** made her *Jasmine Blossom Necklace* as a memento of her bicycle trip through Umbria, Italy, where the fragrant jasmine draped over everything. The necklace is made of enamel, silver, pearls, peridot, and citrine. 2 x 2½ in. (51 x 64 mm).

Photo by Jason Dowdle.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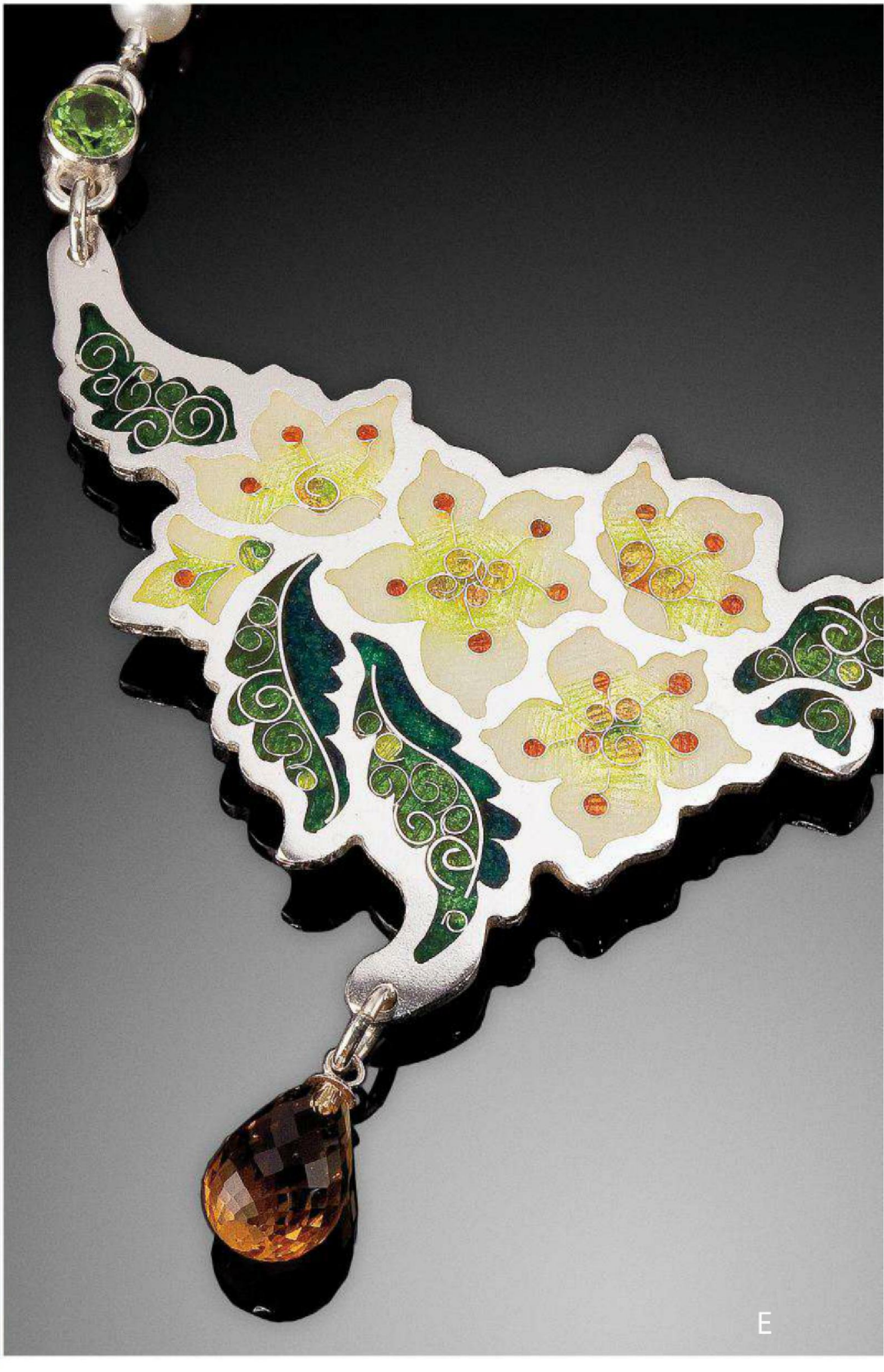
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***To contact the featured artists, see Contacts,* page 87.**

[F] Mizu *Wave Ring*, by **Andrea Williams**, was inspired by Hokusai's iconic *Wave* print. The ring is made of beach stone, reclaimed 18k gold, and hand-pulled Venetian glass.

Photo by Mark Craig Photography.

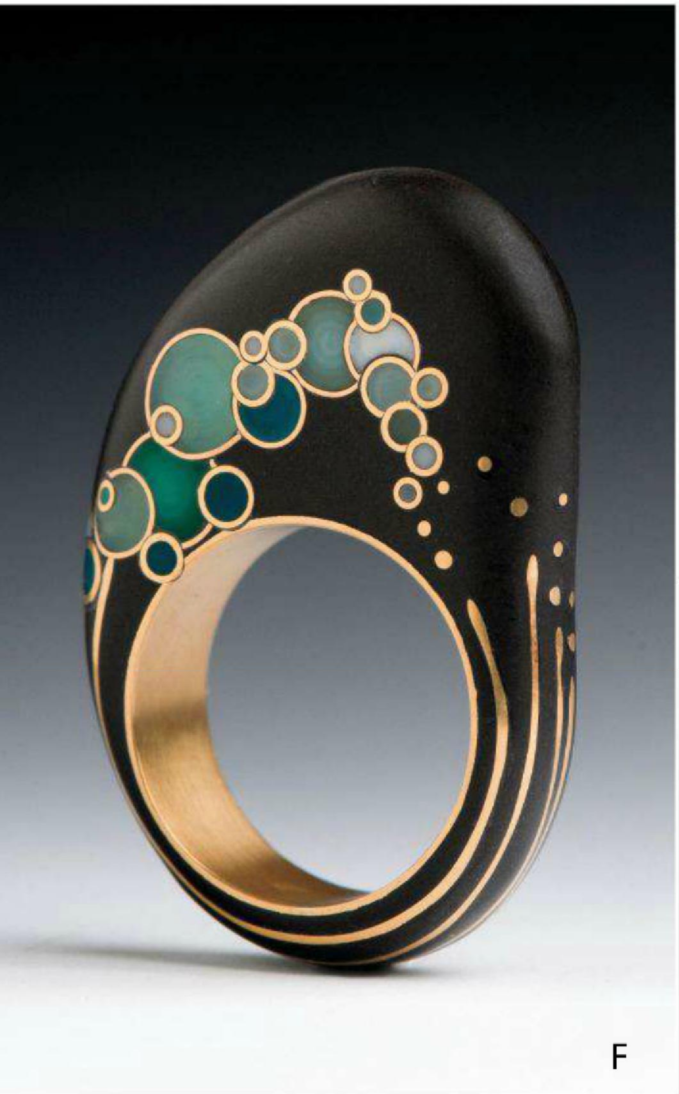
[G] Looking for a contemporary design and an unusual way to accent a stone, **Joan Nelson** created *Peridot on a Disk* of sterling silver and peridot. 4 x 1½ in. (10.2 x 3.8 cm).

Photo by Jim Lawson.

[H] When **Pam East** heard that the John C. Campbell Folk School fund-raising exhibition/auction was being sponsored by Coca-Cola, her thoughts immediately turned to the fluid and elegant lines of the company's logo. *The Real Thing* necklace is made of fine silver metal clay, 24k gold, and enamel. To prevent the red enamel from being discolored by the silver, East lined the entire area with 24k gold foil before applying the enamel.

[I] Living in Alaska's interior, **Alex Lewandowski** is inundated with ravens. With their complex social structure and intricate vocalizations, they are as facinating in person as the roles they have played throughout mythology. The *Spruce Tree Raven Pendant* is made of sterling silver.

[J] **Renee L. Ford**'s love of texure inspired her *Zen Pod Pendant*. The rich natural texture of the



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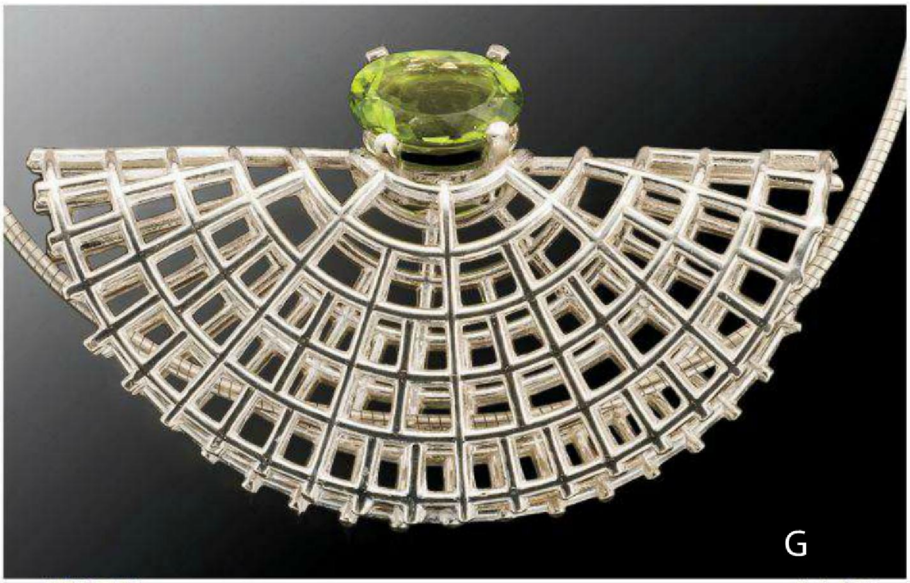

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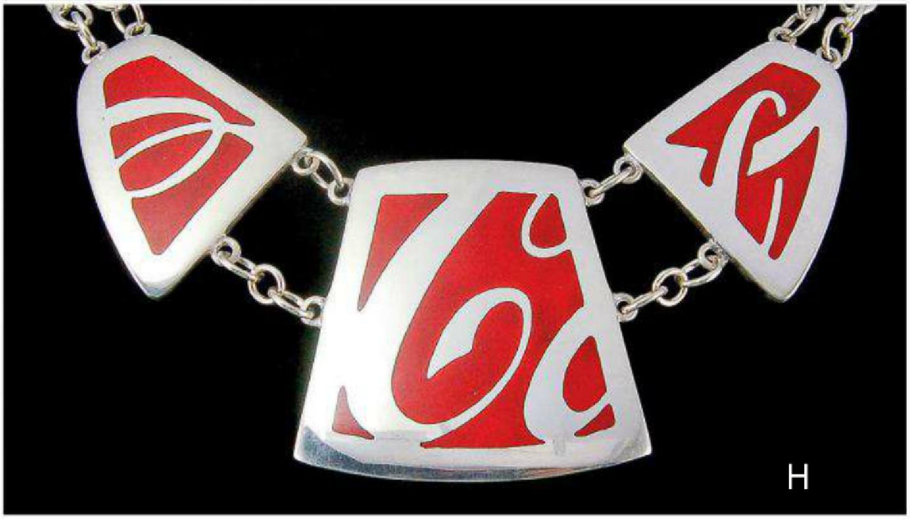
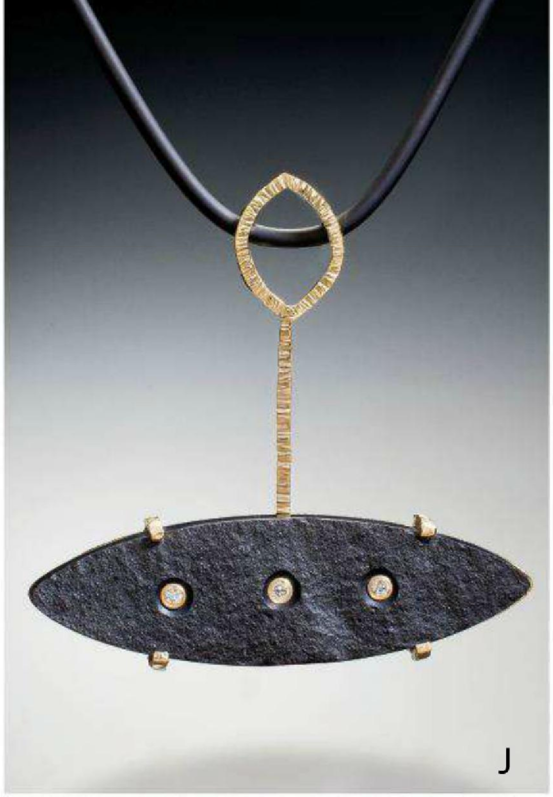


H

jade enabled her to chose a simple form to highlight the complex surface. The brooch is made of 14k gold, diamond, and black jade. $1\frac{15}{16}$ x $1\frac{15}{16}$ x $\frac{3}{16}$ in. (49 x 49 x 5 mm). Photo by Ralph Gabriner.

[K] With a desire to combine traditional elements and modern sculptures, **Hiromi Suter** created her neclace of sterling silver, argentium sterling silver, and 14k gold. $2\frac{3}{4}$ x $2\frac{3}{4}$ x $\frac{25}{32}$ in. (70 x 70 x 20 mm).



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For our guidelines, go to ***www.artjewelrymag.com/submit****, or write to* ***Editor,*** **Art Jewelry,** ***P.O. Box 1612, Waukesha, WI 53187-1612.***

ONLINE EXTRA

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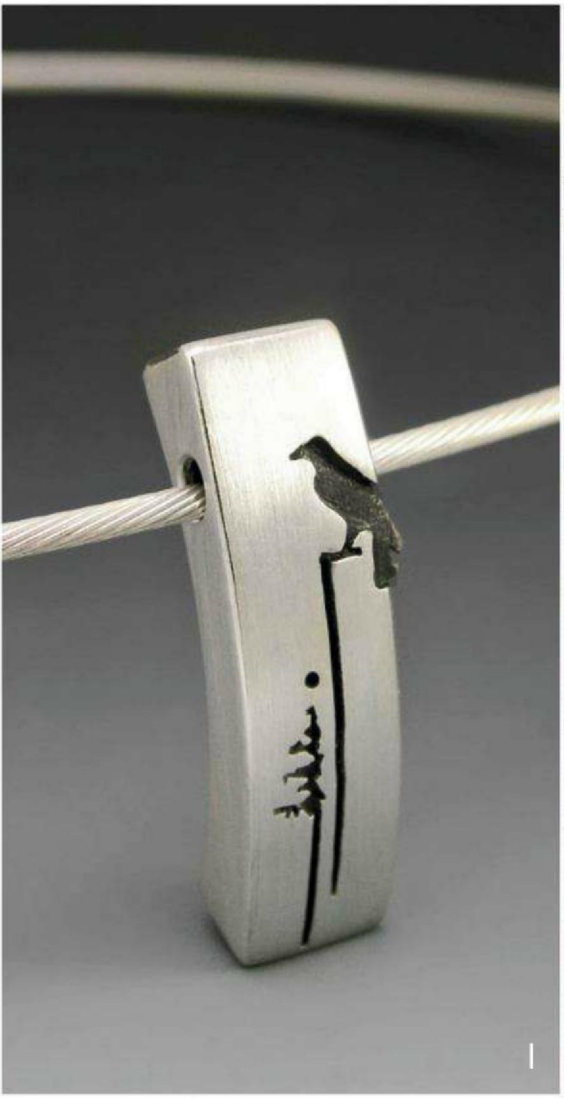
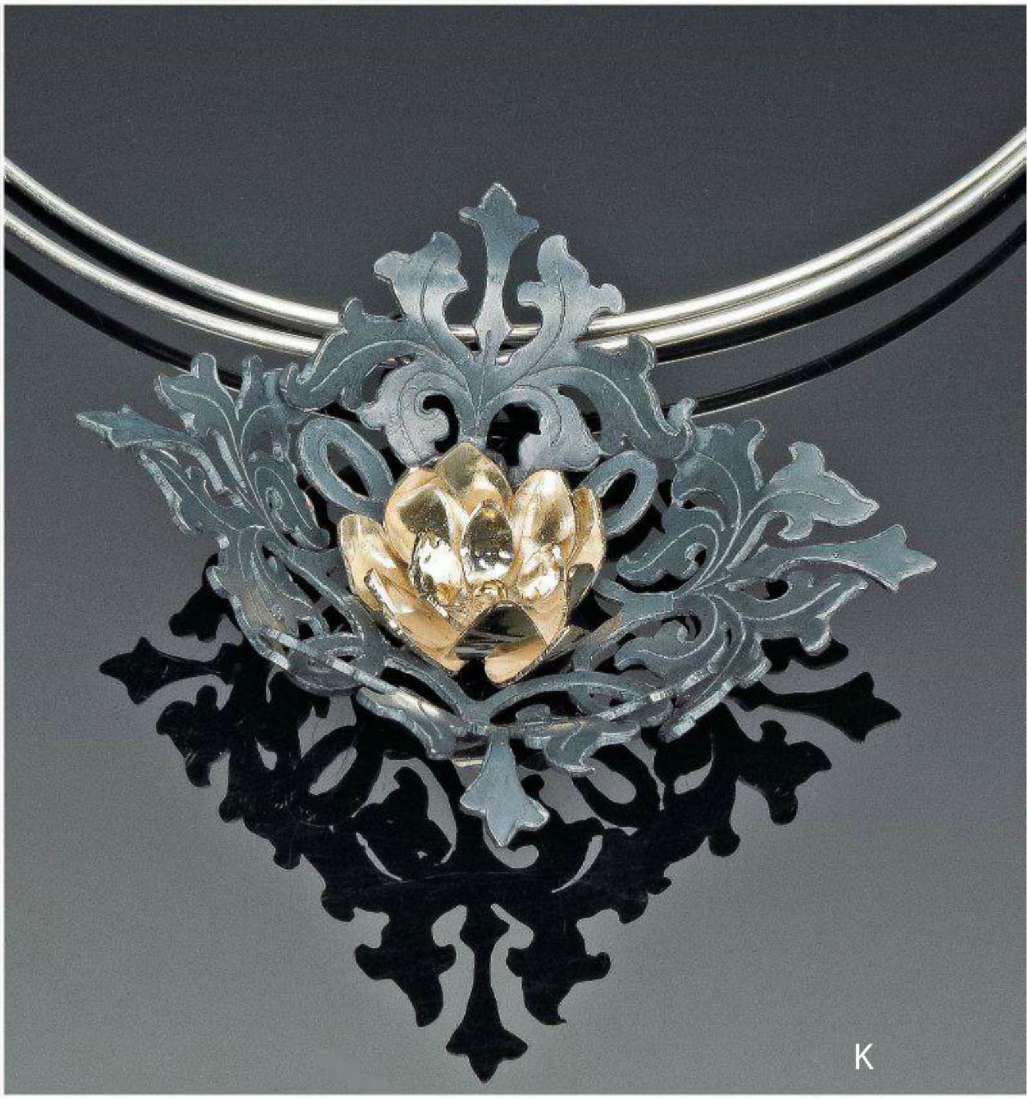
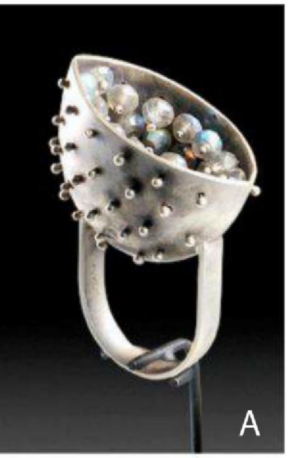




To contact the featured artists, see Contacts, **page 87.**

A conversation with Brandon Holschuh



An adventurous artist who incorporates recycled and natural objects such as camera lenses, animal bones, and living plants into his work, Brandon Holschuh is also a firmly grounded technical expert. Author of *The Jeweler's Studio Handbook*, Holschuh takes pride in never making the same piece twice. Watch for Holschuh's article on setting up a metals studio in the next issue of *Art Jewelry*. —HLW

What inspired you to start making jewelry?

Early on, my fascination with jewelry came from the historical provenance of beads specifically. It had nothing to do with jewelry; it was, "This bead came from a dig site out of northern Africa, it's 2,000 years old," or whatever the story was about where the artifact came from, that intrigued me. An archaeologist will unearth some beautiful amphora or a vase, and if it's in immaculate condition, it goes off to a museum. But there are so many shards of glass and beads that are unearthed that enter the jewelry trade, and sometimes they're overlooked, from a societal standpoint. That's why I started collecting. It was always a collection. And then I started to want to present them; "How can I present this wonderful artifact?" As I got more involved, I always needed some other way to be able to present the work. So learning metalsmithing needed to happen for me to grow from a bead artist to a metal artist. To this day, I can't get away from the bead aspect. I might suspend them, or I might do some contraption with them, but I've still got this close connection to beads.

Your work does look like ancient artifacts.

Exactly. I want the work to look like it was unearthed. I try, in working with the metals, to give them some sort of suppleness, that the metals aren't rigid or cold, that they look like they're alive. If I can get the metals to present as if they were living, or had been living at one time, like a specimen, even better.

Some of the pieces really push the boundaries of wearability.

Up until recently, I didn't really care whether it was wearable if it presented well. It was always about the sculptural aspect. I've sold pieces that the customers never intended to wear, they purchased it as a sculpture. For instance, the *Two Rings Sculpture* **[D]**, those are two giant seed pod gourds that I set atop sterling bands, and I presented them on top of the handmade armatures. That piece I built primarily as a sculpture. And if you wanted to wear one of those large rings, well, okay, more power to you!

It's like a painting of jewelry, instead of a piece of jewelry.

You kind of hit the nail on the head right there. A big part of my work is the presentation of the work. That's one of the biggest challenges for jewelers, is to present art on such a small scale. One piece is a lariat, it really is a simple chain with two pendant pieces. But as it sits, it's a small sculpture. It's kinetic, it's interactive; it really is a sculpture. People come to my booth and say, "What am I looking at?" I like to invoke that curiosity. There's some reason for them to want to look further and ask more questions.

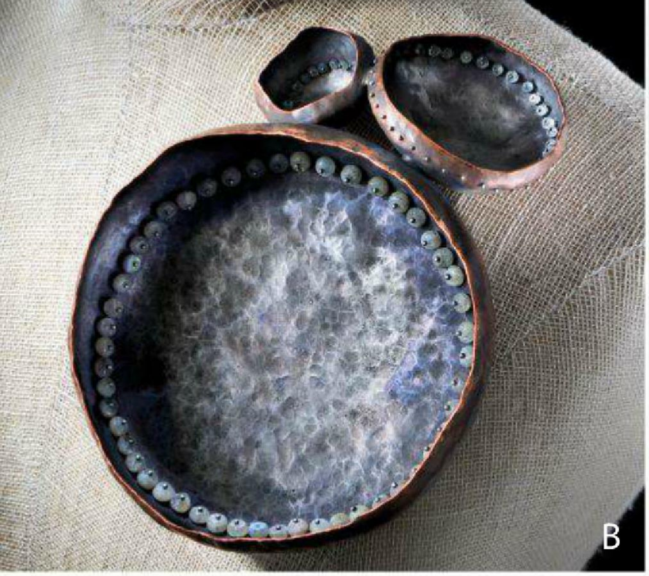
And if they look closer, they'll see gemstones.

I really like to work with stones that don't tolerate torch heat, because I've mastered this flame-setting technique, and I'm pretty proud of it. In the elongated tube neckpiece **[F]**, there are 300-plus natural faceted green and yellow zircons set inside the cavity of that electroformed pod. There's always this question of negative space. Almost in every single piece, there's some black hole, some shadow, where the viewer is wondering, "What's inside there?" There's always something to pique the curiosity, to get them to look inside.

Every aspect of your work is handmade?

I probably could save a lot of time and energy if I bought a sheet of 20-gauge silver and just went off and made the work, but I feel the need to start with the metal fabrication. I pour an ingot, I pour out the metals. And that does play into the designs, as I can feel what the metal's doing and how it's reacting to different techniques. It's always kind of a science experiment. No matter how long you're making, there's always going to be something new that you're going to learn. I have even made my own solder. I make all my chasing tools, I'm making my own stone-setting tools, bezel-pushers and things. I get greater pleasure out of using a tool that I've created than buying one. For anybody who wants to understand the true value of making … it's the same principle that you need to know where your food comes from. You need to know where your supplies and materials come from.

[A] *Ring Sculpture.* Sterling silver, steel, labradorite. 5 x 4 x 2 in. (127 x 102 x 51 mm) (Wood base not shown). [B] *Large Brooch Sculpture.* Sterling silver, copper, steel, white sapphire, spinel, and labradorite. 7 x 5 x 2 in. (178 x 127 x 51 mm). [C] *Ditrichium Palladium Ring Sculpture (with watering can).* Copper, sterling silver, dirt, moss, wood. 4 x 5 x 2 in. (102 x 127 x 51 mm). [D] *Two Rings Sculpture.* Seed pods, sterling silver, steel, wood. 7 x 4 x 2 in. (178 x 102 x 51 mm). [E] *Two Brooches Sculpture.* Sterling silver, steel, wood, Peruvian opal, quartz. 6½ x 6 x 2 in. (165 x 152 x 51 mm). [F] *Electroformed Neckpiece Sculpture.* Copper, brass, sterling silver, steel, wood, green and yellow zircon. 17 x 6 x 3 in. (43.2 x 15.2 x 7.6 cm). [G] *Electroformed Emerald Bracelet.* Copper, sterling silver, emeralds. 2½ x 4 x 2 in. (64 x 102 x 51 mm). Photos by Daniel Fox/Lumina Studio.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Set Up Your Studio:
Metal Clay

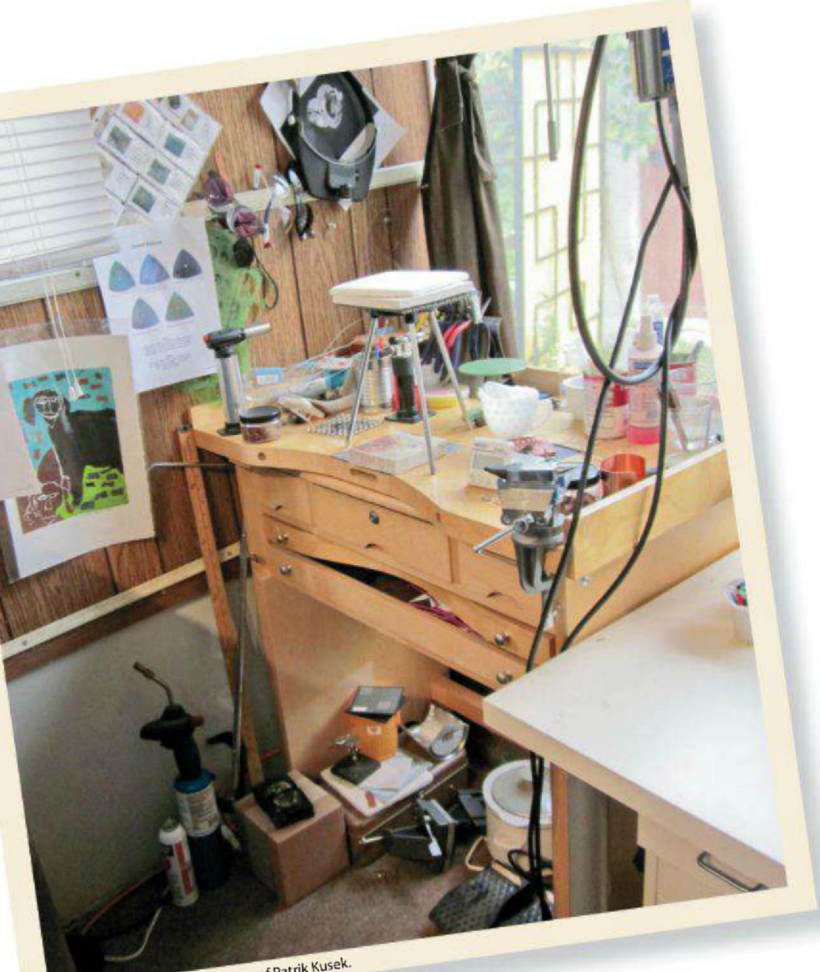


Photo (and main photo) courtesy of Patrik Kusek.

Establishing a safe, practical, and convenient work space is a key step toward making well-crafted jewelry, but it can be a lot to think about! For the metal clayer, a typical studio should include a station for working with clay in its wet and dry states, a heat-safe area for kiln firing, and a dedicated area for finishing the sintered metal clay pieces, which means needing space, electrical capacity, and ventilation. Lighting and ergonomics are crucial to avoid both eye and muscle strain, especially if you tend to work for hours at a stretch. Proper setup and organization means that everything should be where you need it, when you need it, which is especially important when you're working within the time constraints for wet clay.

Beyond the practical considerations, though, your studio should be a space of creativity and inspiration; it should be both welcoming and comfortable. You'll be spending a lot of time here, so make sure that it's a space you can call your own.

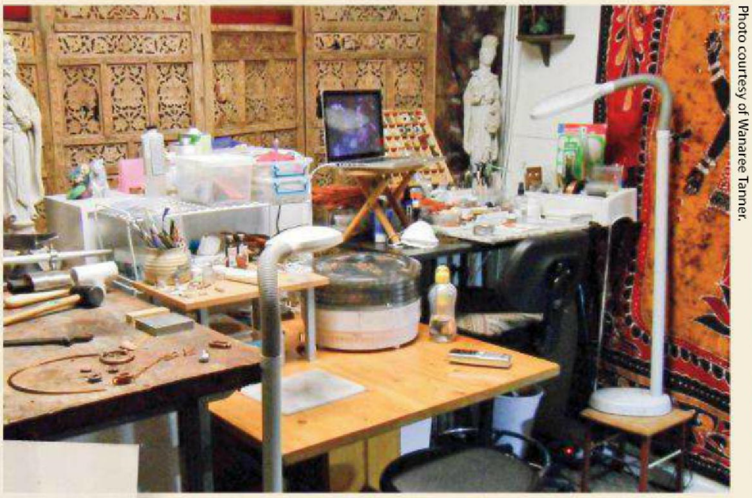


Photo courtesy of Wanaree Tanner.

When designing your work space, think like a contractor, a maker, and an artist.

by Jill L. Erickson

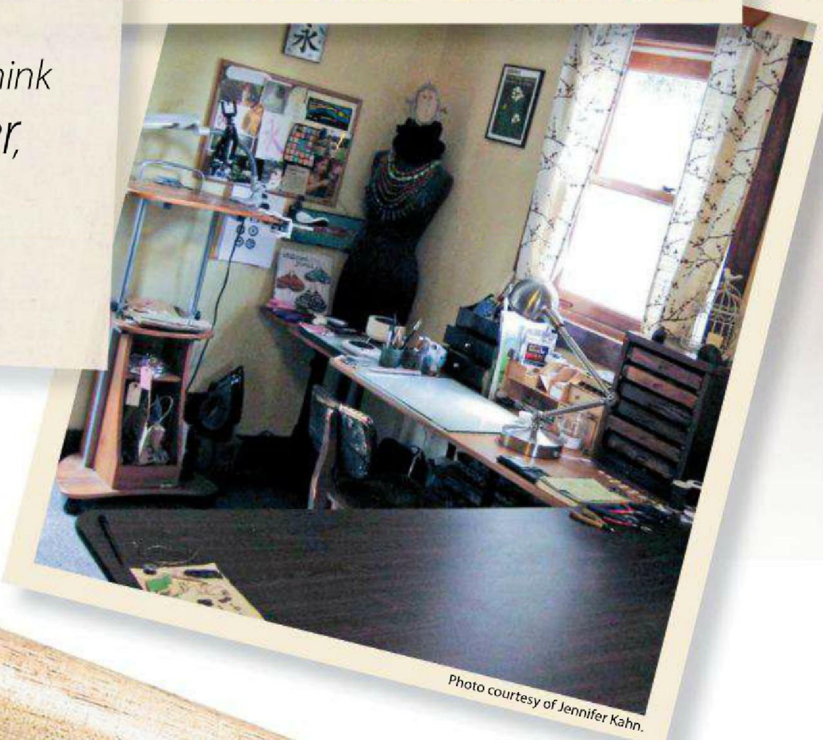


Photo courtesy of Jennifer Kahn.

Think like a Contractor

Photo courtesy of Pam East.

Photo courtesy of Pam East.

When setting up your studio, it helps to think like a building inspector or contractor: Identify the mechanical needs first.

Ventilation

Does your chosen space have good ventilation? Firing with a kiln and using chemical patinas should be done only in a well-ventilated space. For ventilation options, contact a trusted local HVAC (heating, ventilation, and air conditioning) contractor to provide you with an assessment of your space. Be sure to inform the contractor of any additional metalsmithing activities, like soldering, that you might be undertaking to ensure that you select a ventilation system that fulfills your needs.

Electrical requirements

Make a list of all the electrical equipment you'll be using, its voltage/grounding requirements, and where you plan to plug it in (see "Amp it Up," *right*). If you require more outlets, or if your present circuit-breaker panel cannot handle the load, be sure to contact a professional electrician to upgrade your system or to add a junction box. Tell the contractor your exact electrical needs, and ask for solutions that fall into low-, mid-, and top-range costs. Licensed contractors are responsible for performing work that meets your municipality's code requirements. Confirm that the contractor will file all necessary permits with your municipality.

NOTE: In a workroom that has exposed or unfinished ceilings, your contractor may be able to economically run some of the electrical conduit overhead, which is convenient for plugging in light fixtures.

Kiln safety

Consult your kiln manufacturer's instructions to select a safe and appropriate area near a grounded outlet for your kiln. You'll need ample clearance from walls and a sturdy, level, heat-resistant supporting surface. Kiln-safe gloves and eye protection should be at the ready.

Maintain good ventilation when using a kiln, especially when burning out organic cores from hollow-form components. Buy a properly rated fire extinguisher, and keep it readily accessible in your workroom.

amp it up

A typical metal clay studio setup requires the electrical capacity to accommodate an array of equipment:

- Kiln
- Lighting (energy-efficient compact-fluorescent work lights or other sources)
- Mug warmer or food dehydrator
- Tumbler
- Rotary tool (Dremel or flex shaft)
- Ventilation unit
- Optional technology: music dock, computer, etc.

If you live in an arid climate, you should think about adding a humidifier to your list of various studio equipment — it will help keep your clay from drying out too quickly and will increase your work time.

Think like a Maker

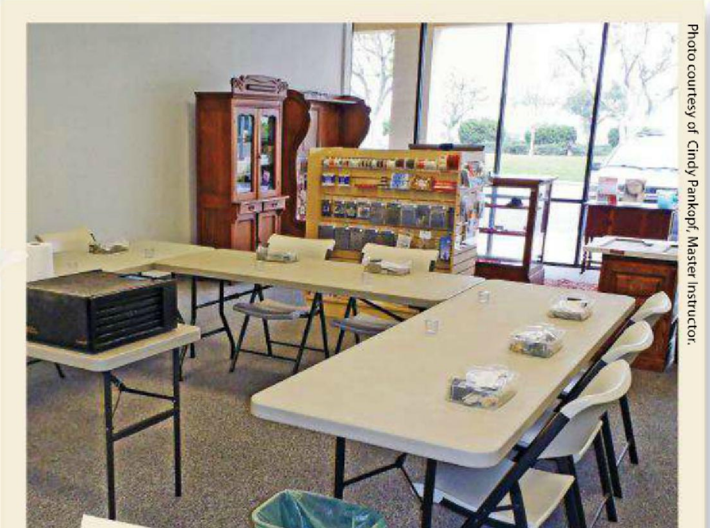


Photo courtesy of Cindy Pankopf, Master Instructor.

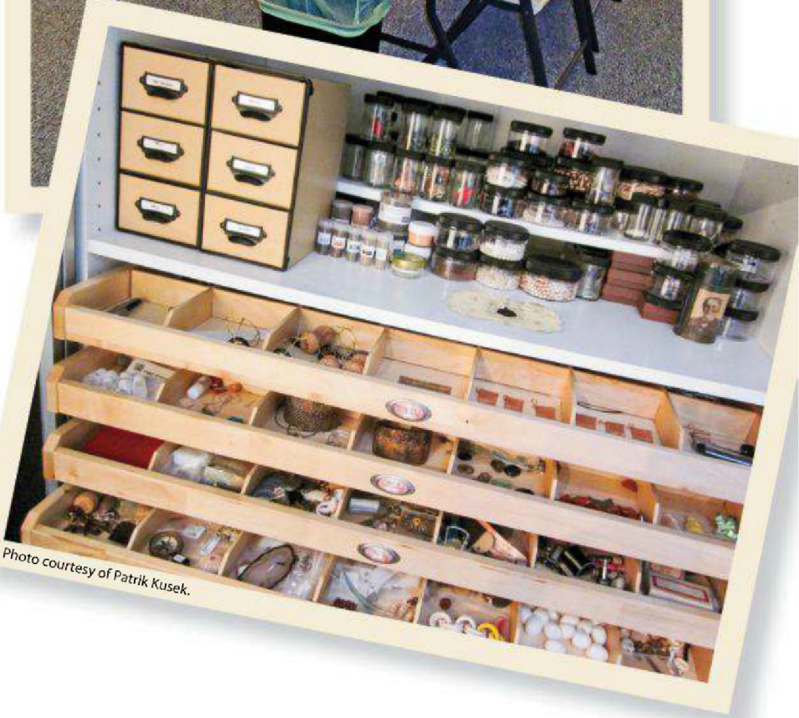


Photo courtesy of Patrik Kusek.

Metal clay has a very limited "open time" before it starts to dry out, so the last thing you want to be thinking about is where a certain tool is or why your work surface is at such an inconvenient height. Setup and organization are key to working the clay quickly — and comfortably! — every time.

Work surfaces

A sturdy, level table makes a suitable work surface. One low-cost option is to purchase folding tables, which are available at discount and home-improvement stores. If you like to spread out, you can make a do-it-yourself table with a pair of sawhorses and a hollow-core door. These types of setups are convenient when you want to rearrange your space or store the table when it's not it use. Other economical sources for tables are estate and garage sales.

An adjustable chair allows you to work at a proper height so that you don't put stress on your neck and shoulders. Good lighting is a must to prevent eye strain, and magnifiers are helpful for detailed work.

Wet clay

Before you open a package of metal clay, it's a good idea to have your tools organized for easy access. Have distilled water nearby for keeping the clay moist during a work session. Although every artist customizes his or her toolbox, you'll be well equipped with these items:

- Nonstick work surface (flexible Teflon sheet or clear plastic report cover)
- Olive oil or natural hand balm
- Distilled water and plastic spray bottle
- PVC tube or acrylic roller
- Thickness-gauge cards or playing cards
- Cutting tools: craft knife or scalpel, tissue blade, shaped cutters
- Rubber-tip shaping and smoothing tools
- Clear, hard plastic sheet ("snake" roller)
- Drinking straws
- Needle tool
- Fine-tip paintbrush
- Texture sheets, stamps, and molds
- Tweezers
- Spatula or palette knife
- Airtight storage containers
- Plastic wrap
- Sponges
- Mug warmer

Optional items you may like to have on hand include shaped supports and mandrels.

Dry clay

Refining your dry metal clay pieces requires yet another set of tools:

- Rubber block
- Needle files*
- Pin vise, drill bits
- Emery boards in various grits*
- Sandpaper sheets or flexible sanding pads in various grits*
- Polishing papers*
- Mini carving tools
- Containers to store dry and reconstituted clay*

*Keep separate sets of these items for each type of clay you work with.

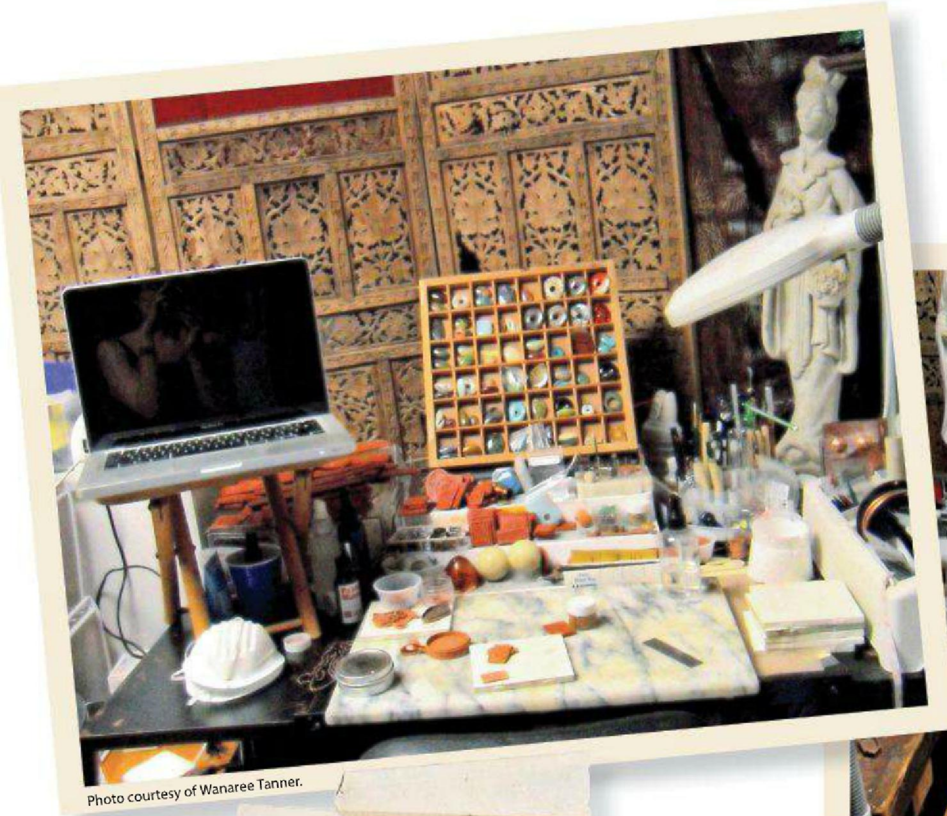
Firing and finishing

Different clays require different firing methods. Kiln firing yields the most predictable results with most clays:

- Kiln and kiln shelf
- Kiln-safe gloves
- Eye protection
- Dust mask
- Vermiculite
- Fiber blanket
- Stainless steel lidded container and activated or coconut-shell carbon*
- Kiln stilts*
- Brass and/or steel brush
- Steel or agate burnisher
- Tumbler, steel shot, burnishing compound
- Liver of sulfur or other patina solutions, glass containers
- Polishing cloth

*Required for firing sterling silver, copper, bronze, and steel metal clays.

For specialized finishing, a rotary tool or flex shaft with attachments comes in handy.



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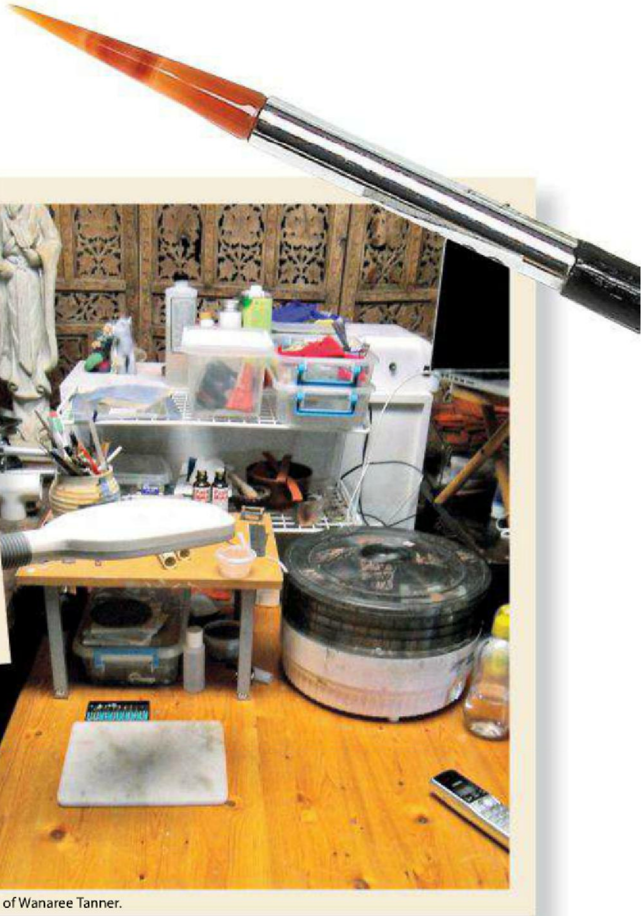


Photo courtesy of Wanaree Tanner.

Think like an Artist

Photo courtesy of Patrik Kusek.

Beyond being a place to work, your studio is a place to create; it is a space for conceptualizing your next project, researching techniques, and exploring various influences.

Find inspiration

Reserve some space for your favorite books, magazines, and how-to resources. A notebook, a sketchbook, and writing/drawing materials are always nice to have on hand. A laptop computer, a tablet, or an old-school bulletin board offer visual respite and are convenient vehicles for inspiring your next project.

Set the mood

Although this doesn't apply to everyone, most people work a little better with some noise in the background, whether it's a favorite MP3 playlist, talk radio, or even a TV show. See what kind of sounds foster creativity and increase concentration, and keep them on hand for your marathon metal clay working sessions.

Don't be afraid to play

Working successfully with metal clay involves a certain amount of trial and error, but it's hard to be optimistic about designs that didn't work out when you're working with an expensive medium. Keep some Play-Doh or polymer clay on hand to work out your design ideas in 3D without the expense of metal clay. AJ

Jill Erickson
Contact: jill@jlerickson.com

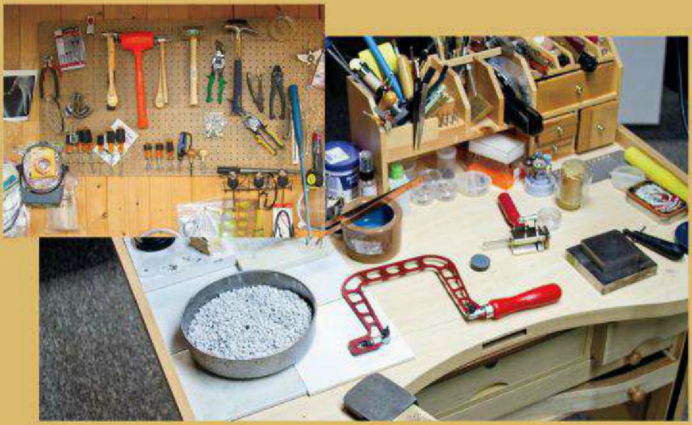
The Ideal Studio Space

Your studio is your workshop, your refuge, your dreamspace. If you're a professional artist, you spend more time there than in any other single place. And if you're a hobbyist, you probably *want* to spend more time there! We asked the artists who contributed projects to this issue to share their studio's best feature.

"The best thing about my studio is…"

Deborah Fehrenbach

"Having three work areas, all at the right working height!"



Jill L. Erickson

"I really enjoy the convenience of having well-lit studio space in the lower level of my home. I appreciate the time and money I save with an on-site workroom. And if inspiration hits at 1 a.m., I just walk downstairs and get working!"

Tim McCreight

"Its location. As a space, it's just a rectangular room with a window. But it's part of a building where I run my professional life. Within 10 paces I have a conventional jewelry studio, a metal clay studio, and the computers on which I design books and run my publishing business. In the same building I have a shipping room, warehouse, storage, and a kitchen. It's a rare day that I don't move frequently between these areas, which works well with my short attention span!"

Wendy Edsall-Kerwin

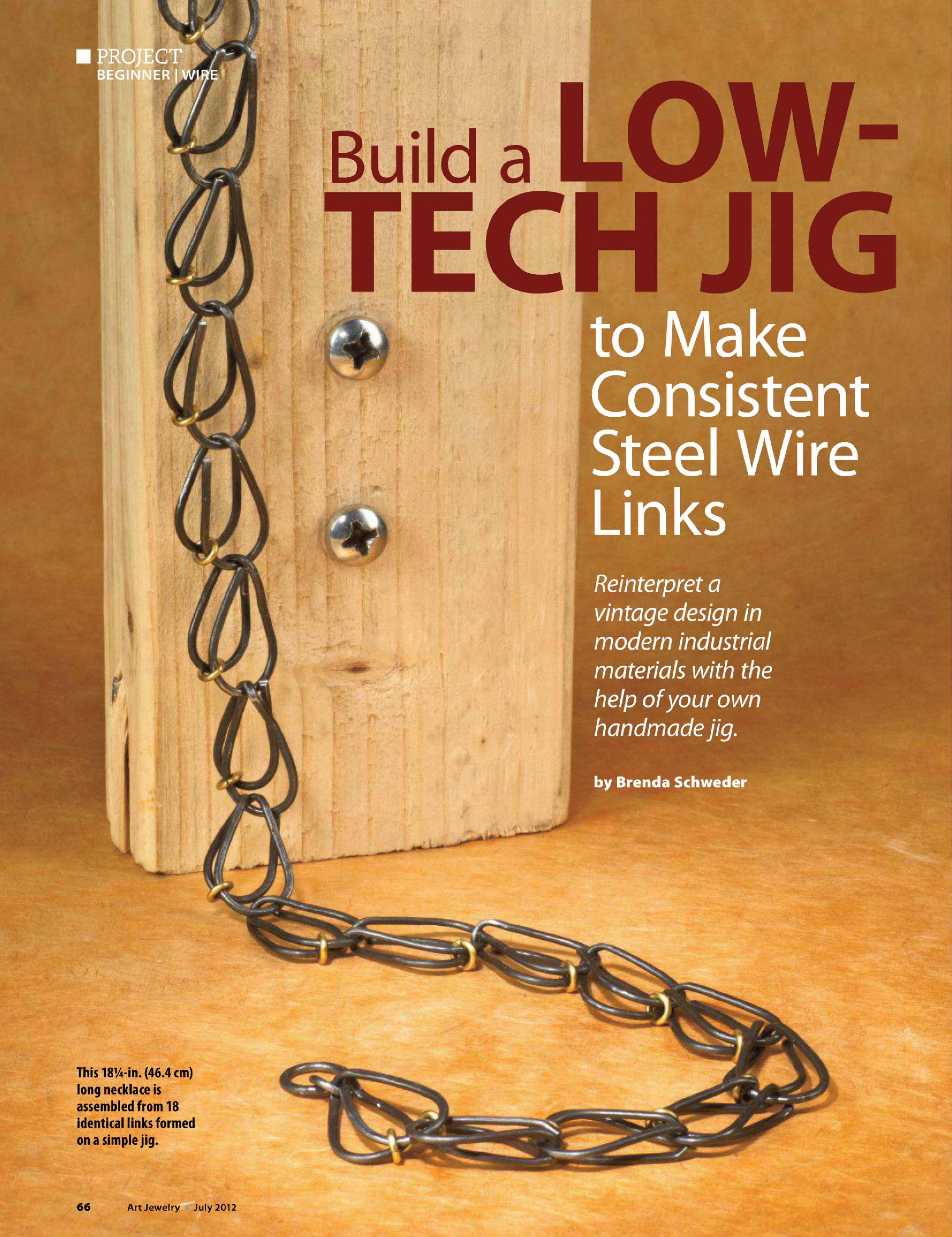
"I like that I was able to make my own jeweler's bench and workbenches. They're the right height for me, have great extras like a wire spool holder and places for my stakes and hammers on the sides, and I saved money by making them."

Ruth E. Baillie

"The natural light, and having a window seat where I can curl up and browse through books, pictures, magazines, etc., or gaze out at nature, and come up with new ideas."

Brenda Schweder

"I love my on-deck shelves. I gather elements in jewelry trays and display them along one wall on a slanted shelving system that my brother, Jeremy, built for me. It helps me keep my inspiration in front of me. And, if I don't get to this next grouping of projects as soon as I'd like, I still love the decorative element they provide."



Build a LOW-TECH JIG to Make Consistent Steel Wire Links

Reinterpret a vintage design in modern industrial materials with the help of your own handmade jig.

by Brenda Schweder

This 18¼-in. (46.4 cm) long necklace is assembled from 18 identical links formed on a simple jig.

As someone who bores easily with repetitive tasks (creating that second earring is *such* a bother), I wanted a way to fast-track consistent chain links. How could I re-create a vintage brass chain in strong and affordable low-carbon, black, annealed-steel wire, and how could I do it without breaking my brain? I decided to do what my Dad would do; I rigged a low-tech jig from a couple of sheet-metal screws and a piece of scrap lumber. Build one yourself with easy-to-find hardware and materials, and make quick (and less mundane) work of your next chain project!

NOTE: Use a separate set of inexpensive files and pliers for working with steel wire. The residual carbon-coating on the steel wire (from annealing) can transfer to files and finer metals, causing them to rust due to steel's propensity for corrosion.

Jig

Select your wood. Choose a short length of scrap wood that's thick enough to accommodate the length of the screws, and long enough for you to clamp it onto your workbench. (I used a 6-in. [15.2 mm] piece of 2 x 4 in. [51 x 102 mm] pine.)

Drill the holes. Mark two dots 1⅜ in. (35 mm) apart on the scrap wood with a pen. Drill a pilot hole at each dot with a #8 (5 mm/3/16-in.) drill bit **[1]**.

Attach the screws. Screw a sheet-metal screw into each hole with a phillips-head bit. Leave a 1/16-in. (1.5 mm) gap between the screw and the wood **[2]**. Attach the jig to your work surface with two C-clamps.

Links

Cut the wire. Put on a pair of tough nitrile gloves; they will help you grip the wire while you form the links. Cut a 6-in. (15.2 cm) piece of 16-gauge (1.3 mm) low-carbon, black, annealed-steel wire with heavy-duty wire cutters.

Shape the links. Place the wire between the two screws diagonally, with one end at the top edge of the left screw. Bend the long end counterclockwise around the right screw **[3]**. Form the wire exactly to the perimeter of the screw's head.

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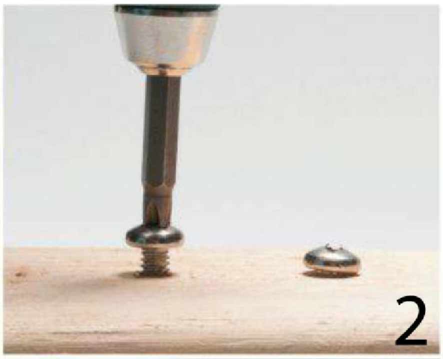
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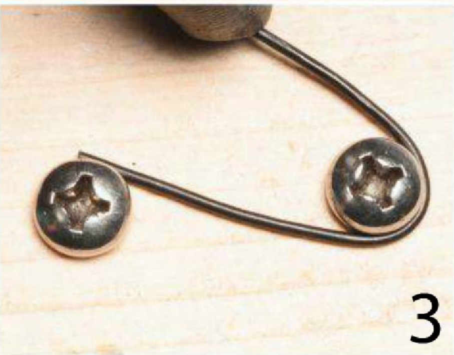
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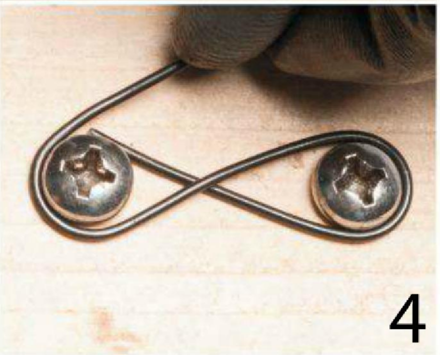
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BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	🎥
How to file		●
Making jump rings	●	●
Plain loop		●
Opening and closing jump rings	●	●

B Basics, *page 82*
🎥 Videos, www.artjewelrymag.com/videos

ONLINE EXTRA

- Learn all about types of sealants.
- subscribers Make your own coiling tool for making jump rings. **www.artjewelrymag.com/reference.**

YOU MAY ALSO LIKE

- Capture Found Objects with Low-Cost Steel Wire (May 2009)
- Make Quick Coil-Wrapped Links (March 2010)

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materials

- Scrap lumber: 6-in. (15.2 cm) piece of 2 x 4 in. (51 x 102 mm) pine (thickness depends on screw length)
- Phillips-head sheet-metal screws: 7/16 x ½ in. (11 x 13 mm), **2**
- Low-carbon, black, annealed-steel wire: 16-gauge (1.3 mm), approximately 112 in. (2.84 m)
- Brass wire: 16-gauge (1.3 mm), 9¾ in. (24.8 cm)

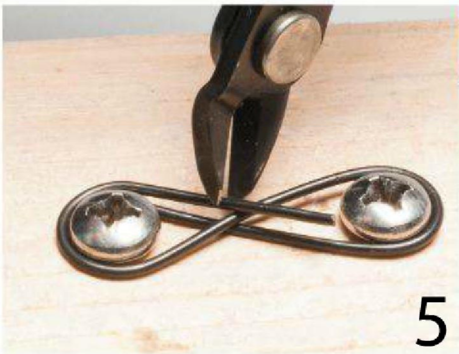
toolboxes, *page 85*

- Wirework
- Sawing/piercing

additional tools & supplies

- C-clamps, 2
- Hand drill:
  - #8 (5 mm/3/16 in.) drill bit
  - Phillips-head bit
- Tough nitrile gloves
- Heavy-duty flush cutters
- Brass or steel wire brush
- Microcrystalline wax

Find out where to buy supplies, *page 87*
See Safety Basics, *page 84*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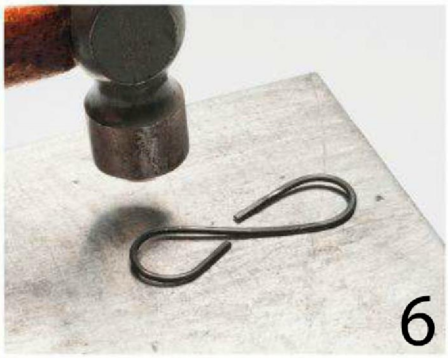
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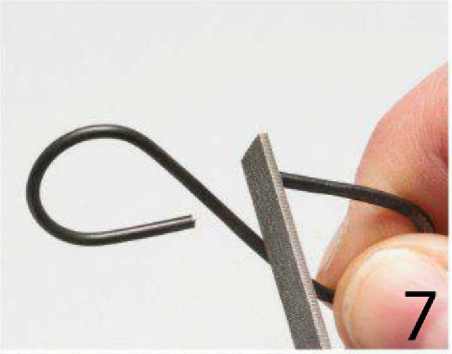
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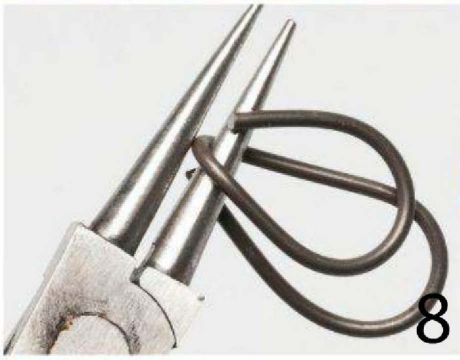
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Continue to form the wire in a figure-8 to the bottom edge of the left screw, clockwise around the left screw **[4]**, and back to the center. The wire should cross at the center of the jig.

Cut the end of each wire ⅛ in. (3 mm) short of the central intersection **[5]**. Remove the link from the screws. It will be an S-shaped link.

Repeat to form all the links for your necklace. (I made 18 links for an 18¼-in. [46.4 cm] necklace. Add or subtract links depending on your desired necklace length.) Remove your gloves when you've finished making the links.

Flatten the links. Place a link on a bench block, and use the flat face of a ball-peen hammer to slightly flatten the link **[6]**. Reshape the link if necessary. Repeat to hammer the remaining links.

File the links. File ▣ the cut ends of the steel wire flush with an inexpensive needle file **[7]**.

Bend the wings. Grasp the center of a link with a pair of roundnose pliers. Bend each side of the link around the pliers' jaw to form the wings **[8]**. The top wing should be slightly offset to the left of the bottom wing. Repeat to bend all the links.

NOTE: Bend each link in exactly the same way, or they will not interlock correctly when you assemble the necklace.

Make the jump rings. Wind roughly 9¾ in. (24.8 cm) of 16-gauge (1.3 mm) brass wire around a ⅛-in. (3 mm) mandrel to make a coil at least 1 in. (25.5 mm) long. Use a jeweler's saw with a 2/0 blade to saw 18 jump rings B ▣ from the coil **[9]**. File the ends of each jump ring.

Clasp

Make the hook. Cut a 2½-in. (64 mm) piece of 16-gauge (1.3 mm) steel wire. Hammer the wire to slightly flatten it. Forge ⅜-in. (9.5 mm) of one end of the wire flatter, widening the tip a bit **[10]**.

Make a plain loop ▣ with the first ½ in. (13 mm) of the less-flattened end of the wire **[11]**.

Bend the wire into a hook (parallel to the flattened end) around a 5⁄16-in. (8 mm) mandrel so that the plain loop extends beyond the tip of the hook **[12]**.

Use flatnose pliers to bend a slight angle in the tip of the flattened end **[13]**.

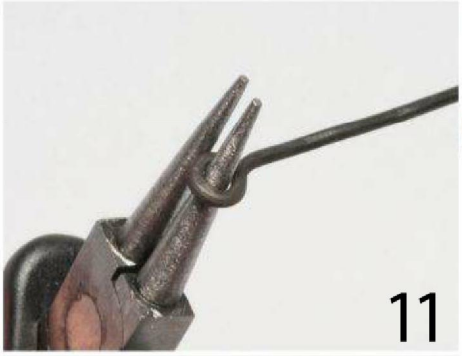
Make the jump ring catch. Make a coil at least ½ in. (13 mm) long around a 23⁄64-in. (9 mm) mandrel with 16-gauge (1.3 mm) steel wire. Make a second coil the same length around a 3⁄16-in. (5 mm) mandrel. Cut one ring from each coil, and file the ends of each jump ring. Hammer each jump ring on a bench block to slightly flatten them.

Assembly

Attach the links. Slip one wing of a link over a wing of a second link. The wing of one link will hang from the central bend of the second link **[14]**.

where to buy low-carbon, black, annealed-steel wire

You can usually find large coils of 16-gauge (1.3 mm) dark, annealed-steel wire in the concrete and rebar section of your local hardware store. It is known as "tie-wire" in the building industry. Thinner gauges of dark, annealed-steel wire, known as "stovepipe wire," are typically sold in smaller prepackaged coils.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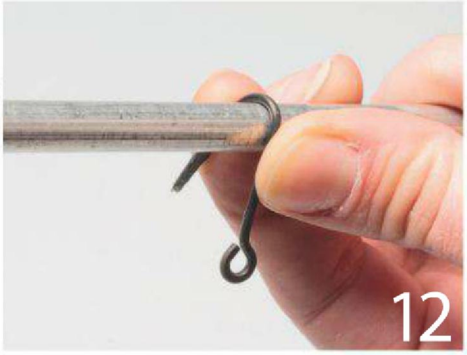
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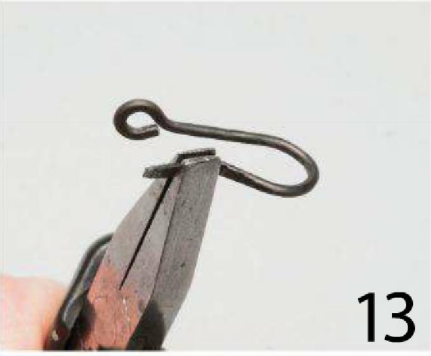
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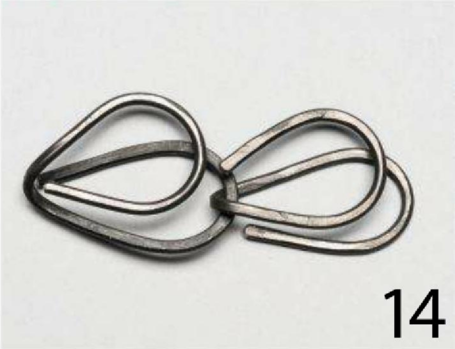
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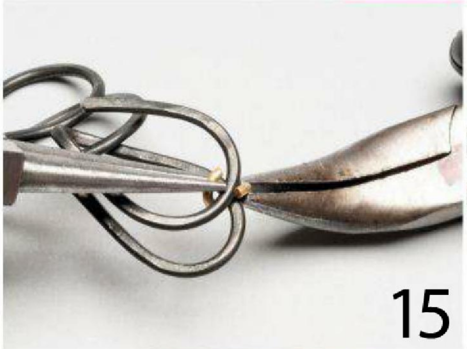
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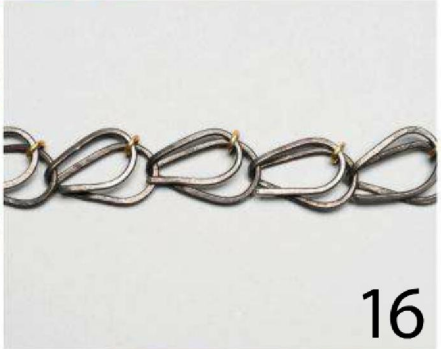
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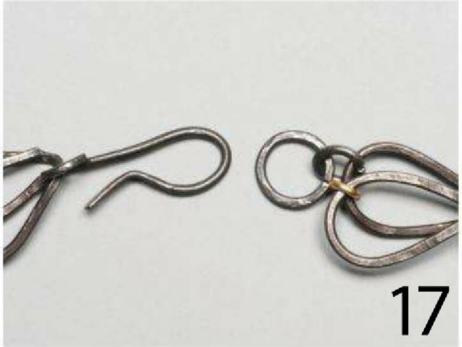
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18

19

Open a brass jump ring B. Close it around the point where the two wings of the first link overlap **[15]**. Repeat until you have added all the links **[16]**.

Attach the clasp. Open the plain loop on the hook clasp, and close it around the bent center of the last link on one end of the chain.

Open the 3/16-in. (5 mm) jump ring, and close the 23/64-in. (9 mm) jump ring. Slide the small jump ring through the large jump ring and a wing on the remaining end of the chain. Close the small jump ring **[17]**.

Finish the necklace. Scrub the necklace with a dry brass or steel wire brush to remove any remaining black, carbon coating **[18]**. A little of the dry brass brush will transfer to the steel wire, giving it a soft, golden glow.

NOTE: To help prevent rust, do not use water when brushing steel.

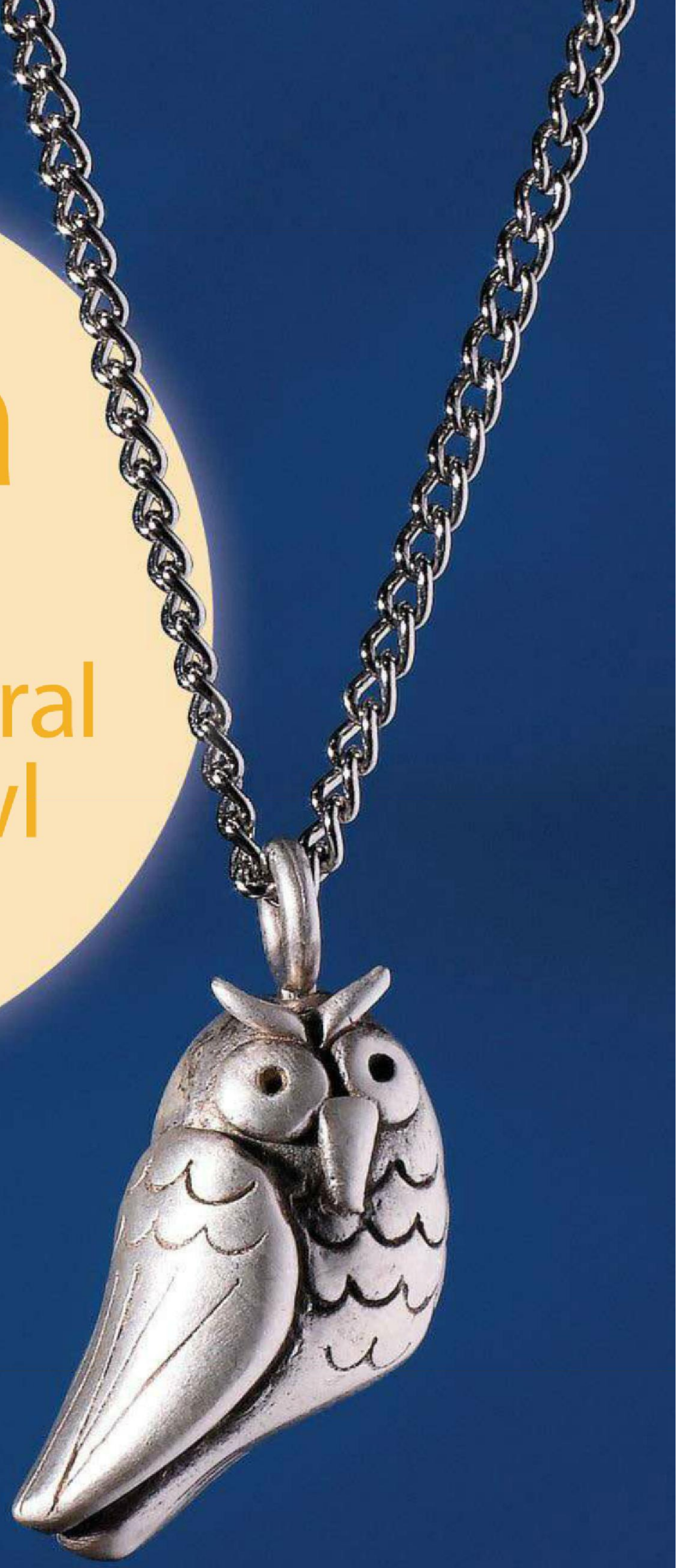
Add a small amount of microcrystalline wax to a soft, clean rag, and lightly coat the necklace with the wax to seal it **[19]**. Let the wax dry, and then buff the necklace with a wax-free part of the soft rag.

Brenda Schweder
Contact: www.brendaschweder.com

This vintage brass chain (*left*) was the inspiration for Schweder's steel wire necklace (*right*).

Life's a Hoot!

Make a Sculptural Metal Clay Owl Pendant

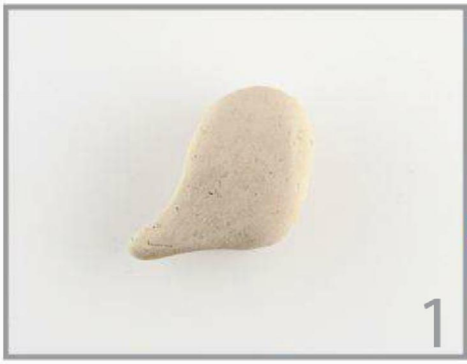


This sweet and simple metal clay pendant is only 25.5 mm (1 in.) from the top of the bail to the tip of the tail feathers.

Build your vocabulary of basic shapes to create a whimsical charm.

by Ruth E. Baillie

In this introductory metal clay project you'll learn how to sculpt simple shapes, assemble them, and use a tissue blade and a modified coffee stirrer to apply bird-specific markings. Before you sculpt this pendant in metal clay, try making the simple shapes out of polymer clay. Experiment with different sizes, shapes, and surface finishes to create birds with varying gestures and personalities. Once you master the shapes used to create this owl pendant, you'll have the skills to make a menagerie of animals!



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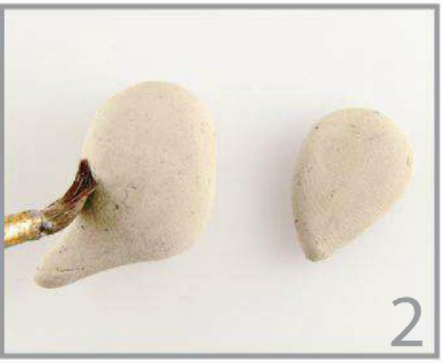


2

Before you begin. Familiarize yourself with the shapes in "Simple Shapes" (*below*). Remember, the recommended sizes are merely guidelines; nothing in this project requires precise measuring.

Form the body. Lightly coat your hands, a flexible Teflon sheet, coffee stirrer, and tissue blade with olive oil or natural hand balm. Roll approximately 8 g of metal clay into a ball with a 19 mm (¾-in.) diameter. Shape the ball into an oval, and pinch the clay at the bottom of the oval to form the tail. Angle the tail to the left, and taper it to a softly pointed end **[1]**.

Form the wing. Roll a 10 mm (13⁄32-in.) ball of clay, and shape it into a teardrop. Place the teardrop on the flexible Teflon sheet, and press down on it with your finger to slightly flatten it.

Attach the wing. Dip a fine-tip paintbrush in water, and lightly moisten the left side of the body **[2]** and one flat side of the wing. Place the narrow end of the wing on top of the pinched tail. Gently wrap the wing up the left side of the body. Press the two pieces together for a few seconds to seal the join.

Make the wing and body markings. Use a craft knife to cut the end of a plastic coffee stirrer in half lengthwise. Cut and remove half of the cut end of the stirrer.

Press the end of the modified coffee

simple shapes

If you are unfamiliar with sculpting in metal clay, it is extremely helpful to practice making these shapes (I strongly suggest making the whole owl) in polymer clay before you start this project. See how many different types of birds and animals you can come up with!

Round: Roll the clay firmly in your palms to create a ball. If there are crease lines on the ball, apply more pressure and continue to roll. Practice making the different sized balls required for this project: 19 mm (¾ in.), 10 mm (⅜ in.), 5 mm (3⁄16 in.), and 3 mm (⅛ in.). Use a circle template or ruler to measure the size of the balls.

Oval: Form a ball, then roll it back and forth in your hands and apply pressure on opposite ends, gently tapering and rounding each end.

Teardrop: Form a ball, then roll harder on half of the ball either with your hand or fingers, tapering one end to a point.

Log: Form a ball, then apply even pressure along the length of the ball as you roll it back and forth in your hands.

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	🎥
Drying metal clay	●	
Using a tumbler to polish metal clay	●	●
Liver of sulfur patina	●	●

B Basics, *page 82*
🎥 Videos, www.artjewelrymag.com/videos

YOU MAY ALSO LIKE

- Make Your First Hollow Metal Clay Bead (November 2010)
- Fire, Paste, Refire: Repurpose Fired Metal Clay Pieces with Oil Paste (September 2006)

Where to buy: 800.533.6644, **www.artjewelrymag.com/store**

materials

- 10 g fine silver metal clay
- Fine-silver embeddable bail, or fine-silver wire: 16- or 18-gauge (1.3- or 1.0-mm), 25.5 mm (1 in.)
- Chain with clasp

toolboxes, *page 85*

- Metal clay
- Finishing

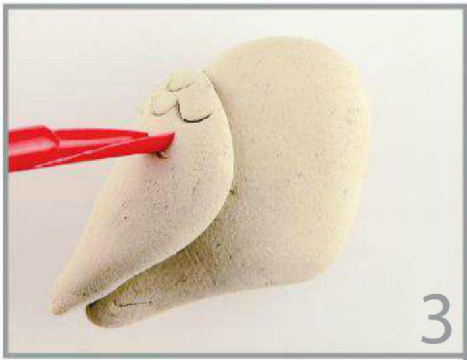
additional tools & supplies

- Coffee stirrer
- Pliers: roundnose, flatnose (optional)
- Sanding pads: superfine and ultrafine
- Liver of sulfur (optional)

Find out where to buy supplies, *page 87*
See Safety Basics, *page 84*

Metal Clay Dryness

Wet	A lot of moisture; very pliable
Semi-dry	Some moisture; firm, holds its shape
Mostly dry	Nearly devoid of moisture; rigid
Completely dry	No moisture; can be fired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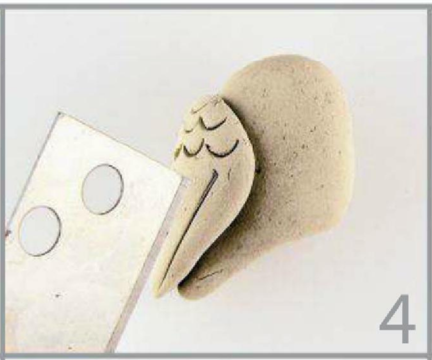
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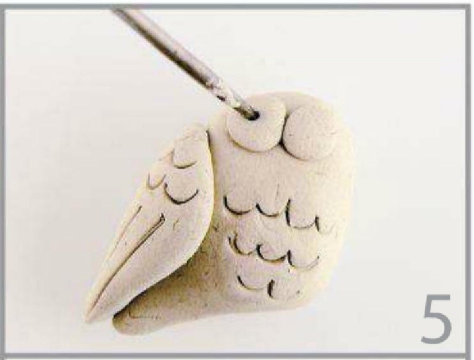
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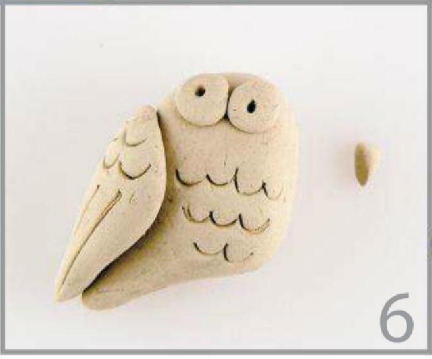
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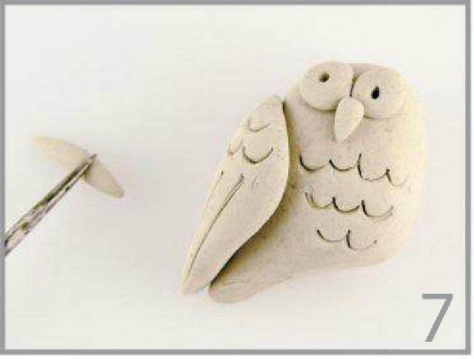
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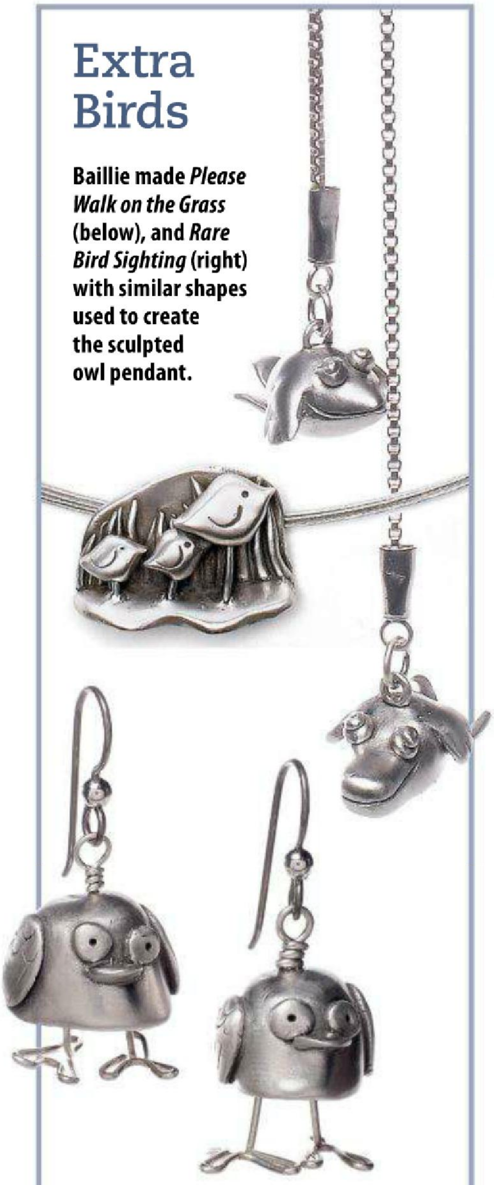
Extra Birds

Baillie made *Please Walk on the Grass* (below), and *Rare Bird Sighting* (right) with similar shapes used to create the sculpted owl pendant.



***Humphrey and Trisha: Love Birds* (above) have dangling sterling silver wire legs and ear hooks.**

stirrer into the top of the wing to make a semicircular mark **[3]**. Make two or three rows of these marks on the top one-third of the wing, connecting the ends of each semicircle to create a scalloped pattern.

Use a tissue blade to mark vertical lines on the lower two-thirds of the wing **[4]** to represent the owl's flight feathers.

Make three or four horizontal rows of scallops on the owl's body.

Attach the eyes. Roll two 5 mm (3⁄16-in.) balls of metal clay. Moisten the owl's head, and one side of each ball. Press each ball onto the head to form the eyes, flattening them slightly as you attach them. Press them together for a few seconds. Mark the center of the eyes with a needle tool **[5]**.

Attach the beak. Roll a 3 mm (1⁄8-in.) ball of metal clay. With your fingertips, form the ball into a teardrop shape **[6]**. Moisten one side of the teardrop, and attach it to the face below and between the eyes, with the tapered end pointing down. Press the pieces together for a few seconds.

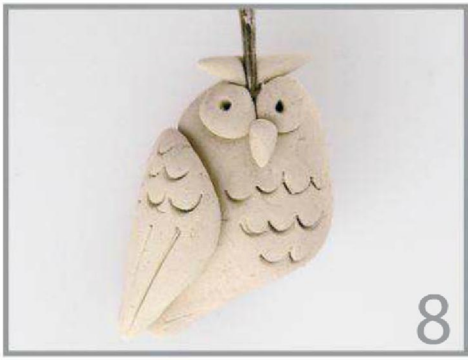
Add the feather tufts. Roll a 5 mm (3⁄16-in.) ball of clay, and shape it into a log. Taper both ends. Moisten the owl's head above the eyes. Use a needle tool to pick up the tapered log at its midpoint **[7]**, and gently press it onto the head **[8]**. Hold the pieces together for a few seconds.

Insert a bail. Insert an embeddable fine-silver bail into the top of the head **[9]**.

NOTE: If you don't have a fine-silver embeddable bail, you can make your own bail using 16- or 18-gauge (1.3 or 1.0 mm) fine-silver wire. Cut a 25.5 mm (1-in.) piece of wire, and grasp it at its midpoint with roundnose pliers. Bend the wire in half over the jaw of the pliers, then use flatnose pliers to twist the ends of the wire together a few times below the roundnose pliers' jaws. Insert the twisted ends into the wet clay.

Reinforce the joins. Carefully brush a little water on each of the points where the eyes, beak, tufts, and wing join the body. Place the owl on a mug warmer, or let it air dry until it's completely dry **B** (see the "Metal Clay Dryness" chart, *page 71*).

NOTE: You don't need to wet the bail area. That join is fine silver against clay, not clay on clay, so the moisture doesn't help seal the seam.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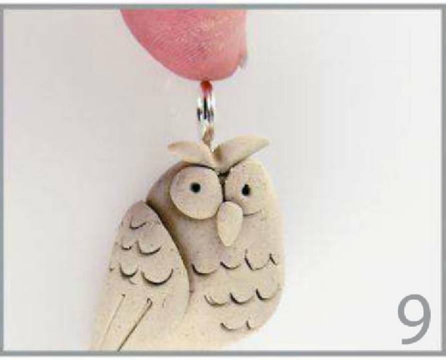
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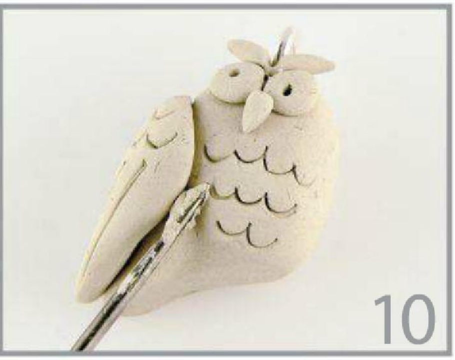
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Process photos by Ruth E. Baillie.

If necessary, use a toothpick or a clay shaper to apply fresh clay to any gaps in the joins to reinforce the connection **[10]**. If there are any recessed areas, creases, or cracks in the clay after drying, use a clay shaper to fill these with fresh clay. Again, allow the owl to dry completely.

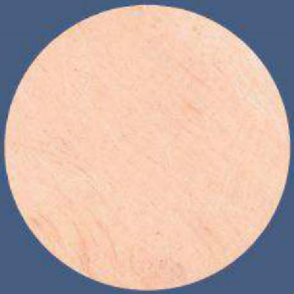
Refine the pendant. Put on a dust mask, and use a superfine sanding pad to gently refine the surface of the owl, making sure to retain the body's roundness. Use an ultrafine sanding pad to smooth the body even further.

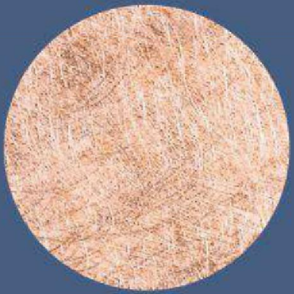
Fire and finish the pendant. Place the pendant on a kiln shelf, and fire it according to the clay manufacturer's instructions. Allow the pendant to cool completely in the kiln.

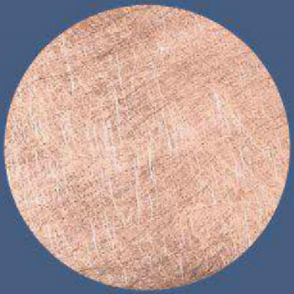
NOTE: A kiln shelf works well for this piece because the back of the owl is flat. For objects that have no flat back, use a kiln-safe fiber blanket. Do not torch-fire this piece; it is quite thick, so it will not sinter well with just a torch.

Sand the surface of the pendant with sandpaper or sandpaper pads, scrub it with a stainless steel or brass brush, or tumble B ▣ it with steel shot and burnishing compound to give it the texture your desire (see "Metal Surface Finishes," *right*). Apply a liver of sulfur patina B ▣ to highlight the texture, and use a polishing cloth or fine-grit sandpaper to remove the patina as desired. Thread a chain through the bail.

metal surface finishes


Steel brush


80-grit sandpaper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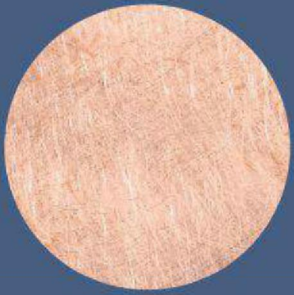
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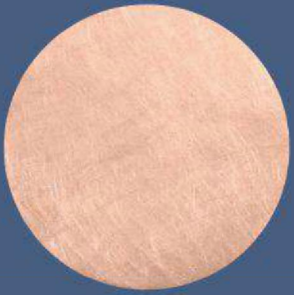
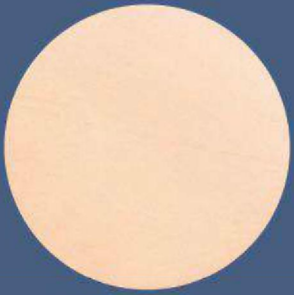
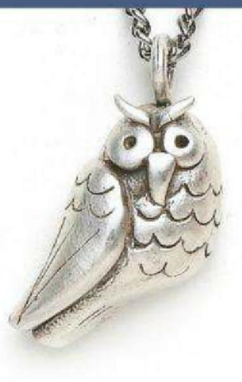
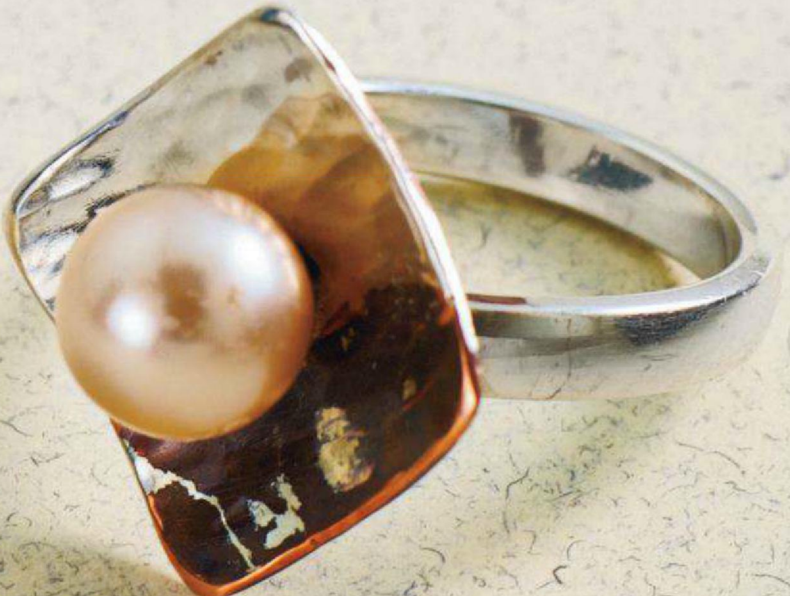

1000-grit sandpaper


Buffed

Ruth E. Baillie
Contact: www.birdland creations.com



Take a Different Approach to Mokume Gane



*Use a **rolling mill** and a **torch** to **fabricate a small-scale mokume-gane billet out of wire.***

by Deborah Fehrenbach

Fabricating a sheet of mokume gane can be a daunting task for even the most experienced jewelry maker. Getting 16 or more layers of metal to fuse is not for the faint of heart! I'll show you a simplified way of making a narrow mokume-gane billet out of Argentium sterling silver and copper wire. Using basic fusing skills and two different metals, you can become comfortable with fusing (or just get over having a meltdown!) and fabricate your own patterned stock.

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	🎥
Basic sawing of metal	●	●
Lighting and using a torch	●	●
Pickle		●
Annealing metal	●	●
How to file		●
Sanding	●	
Using a dapping block	●	●
Drilling through metal	●	●
Soldering	●	
Make a simple band ring, parts 1 and 2		●

B Basics, *page 82*
🎥 Videos, www.artjewelrymag.com/videos

materials

- Argentium sterling silver wire:
  - 10-gauge (2.6 mm), round, 14 cm (5½ in.)
  - 12-gauge (2.1 mm), half-round, length depends on ring size (can substitute with sterling silver)
- Copper wire: 10-gauge (2.6 mm), round, 14 cm (5½ in.)
- Sterling silver wire: 20-gauge (0.8 mm), square, 5 mm (3⁄16 in.)
- Half-drilled pearl: 8 mm (5⁄16 in.)
- Sterling silver ear wires, 2 (optional)

toolboxes, *page 85*

- Hammering
- Sawing/piercing
- Soldering
- Finishing

additional tools & supplies

- Locking vise grips
- Baldwin's patina
- Two-part epoxy
- Swage block (optional)

Find out where to buy supplies, *page 87*
See Safety Basics, *page 84*

Mokume-gane billet

Prepare the wires. Use a jeweler's saw and a #1 or 1/0 blade to cut B 🎥 a 14 cm (5½-in.) piece of 10-gauge (2.6 mm) Argentium sterling silver round wire. Cut the same length of 10-gauge (2.6 mm) round copper wire. Roll the silver wire to 2 mm (5⁄64 in.) thick with a rolling mill. Repeat to flatten the copper wire **[1]**.

NOTE: If you don't have a rolling mill, you can also flatten your wire by hand with a forging hammer.

Stack the silver wire on top of the copper wire, and check the fit; the two flattened wires need to be perfectly straight and flush with each other.

TIP: A quick fix for straightening wire is to lay it on a steel bench block with the raised section up. With a non-marring hammer (I use a plastic mallet), gently strike the wire at one end, and work toward the raised section of wire **[2]**. You can also lay a piece of hardwood across the wire, and strike the board. This technique works well for metal sheet, but can also help straighten round wire that has been flattened.

Clean the wires. Clean both pieces of wire thoroughly with a scouring pad. When you run water over them, the water should sheet off the wires, not bead up. After they're clean, don't touch the surfaces of the wires with your fingers.

Flux the wires. Place the copper wire on a flat charcoal block. Light a large-tip torch B 🎥, and gently warm the metal with a bushy flame, but don't get it hot enough that the metal changes color. Brush or spray Prips flux (see "Prips Flux Recipe," *page 77*) on the copper wire. Repeat until the wire is covered with a thin, even coat of flux. Repeat to flux the silver wire.

NOTE: Prips flux is my first choice, but you can also use Stop-Ox, paste flux, or liquid flux. You don't want to over-apply any of the fluxes, especially paste; too much flux will make fusing more difficult.

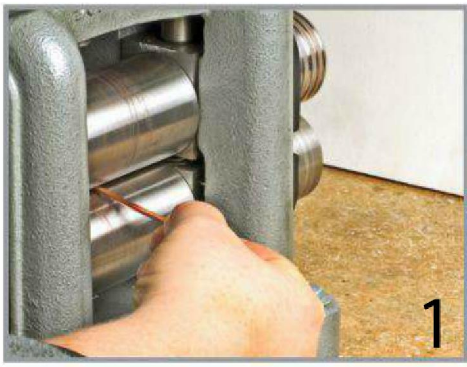
Place the silver wire on top of the copper wire **[3]**.

NOTE: Do not bind the wires together! The binding wire will fuse into the silver. If necessary, use a soldering pick or a thick pair of tweezers to gently press the wires together while fusing.

Fuse the wires. Gently heat the wires with a soft, bushy flame until the flux stops bubbling. Adjust the wires with tweezers if they move.

With a large soldering flame, heat one end of the stacked wires. Move the torch back and forth down the length of the wires until the flux runs clear.

Focus the flame on one end of the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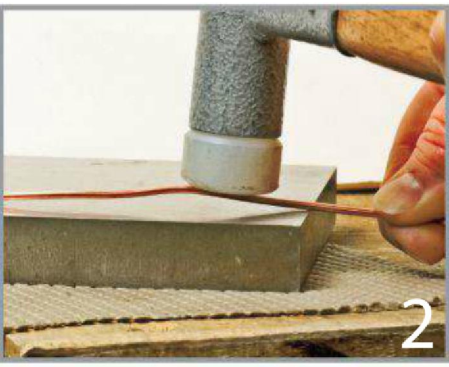
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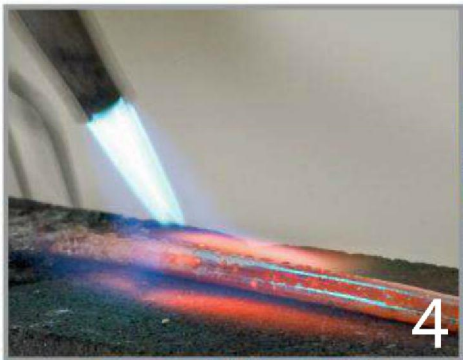
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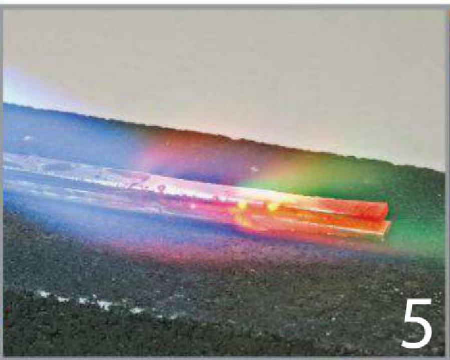
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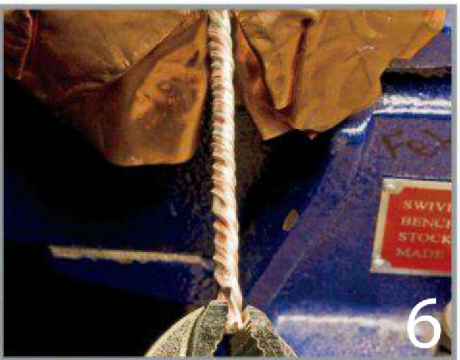

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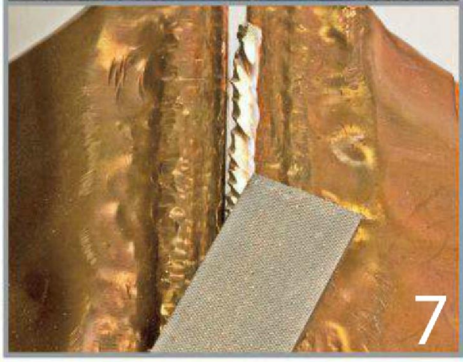
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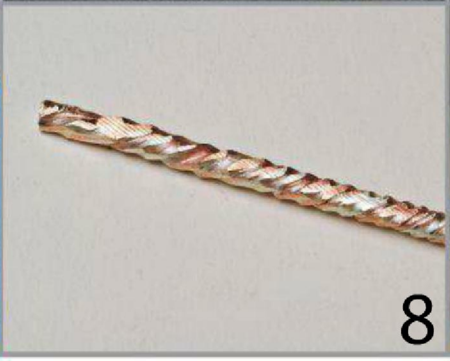
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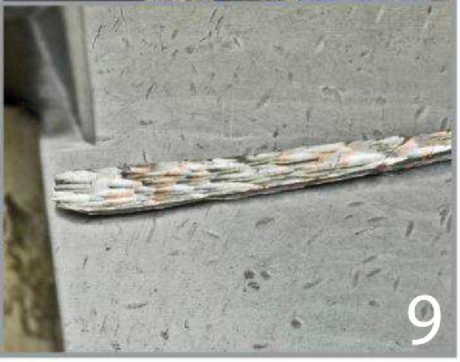
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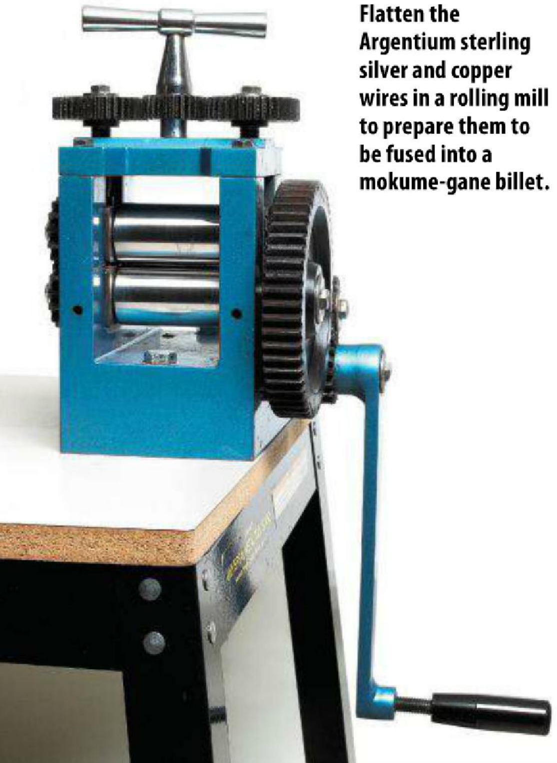
stacked wires, and angle it toward the copper wire from the side to bring both wires to fusing temperature at the same time **[4]**.

The silver will look wet and shiny when it reaches fusing temperature. As you move the flame down the length of the wire, you can see a shiny silver line move down the join as it fuses, much like solder flowing down a seam **[5]**. Remove the flame when the wires are fully fused.


Flatten the Argentium sterling silver and copper wires in a rolling mill to prepare them to be fused into a mokume-gane billet.

Cool the rod to at least black heat (the metal no longer glows orange) before quenching; Argentium may crack or break if quenched while still red-hot. There should be little to no sizzle when the rod is quenched in water. Place the rod in pickle to clean it, then rinse it in water, and dry it completely. Check your fused join; if there are gaps (See "Troubleshooting," *opposite page*), repeat to fuse the length of the wires completely.

Planish the fused wires. Set the fused-wire rod copper-side up on the bench block. Gently planish the copper side of the fused rod with a planishing hammer. This ensures the metal is compressed, reduces the possibility of the rod breaking or delaminating in future steps, and sets it for rolling.

Create the billet. Roll the fused-wire rod to 2 mm (5⁄64 in.) thick with the rolling mill. Cut the rod in half widthwise with the jeweler's saw and a #1 or 1/0 blade. Straighten the fused-wire rods, and stack the two halves. Make sure the metal layers alternate, and fuse the two halves. Quench, pickle, and rinse the billet.

Square the billet with square wire rollers in a rolling mill. This gives you a tighter pattern with more definition. If you don't have a rolling mill (or if your rolling mill doesn't have square wire rollers), forge the wire by hand with a forging hammer.

Repeat to create as many layers of metal as you desire.

NOTE: The more layers you fabricate, the more intricate the pattern will be. Traditional mokume gane normally has 16–21 layers. I fused four layers (the minimum number of layers required to be considered true mokume gane) for this project, but you can repeat the process to create as many layers as you like.

Twist the billet. Clamp one end of the billet horizontally in a vise. With vise grips, grip the opposite end of the billet. Pull away from the vise, and twist the billet clockwise at the same time. Continue to twist until the metal resists. Anneal B, pickle, rinse, and dry the billet. If there are areas that are still not fused, fuse them while annealing your billet. Continue twisting until the billet is twisted tightly **[6]**. The scale of your pattern is determined by how tightly you twist.

Square the billet. Secure the length of the mokume-gane billet horizontally between the jaws of the vise. Keep the ridges (created by twisting) above the jaws. File the raised sections of the billet with a wide, flat file **[7]**.

prips flux recipe

- **1 qt. (0.95 L) water**
- **120 g (4.2 oz.) boric acid**
- **80 g (2.8 oz.) TSP (trisodium phosphate)**
- **80 g (2.8 oz.) borax**

Mix together, and heat until everything is dissolved.

To use:
Gently warm the metal with a torch, but don't heat it to the point where the metal changes color. Spray or brush on a layer of Prips flux. Repeat until your metal is fully coated with an even layer of flux.

troubleshooting

Problem: The wires don't fuse.
Possible solutions:
1. Your flame is not large enough or hot enough; use a larger tip on your torch. A handheld butane torch will not work.
2. Your flame is not aimed correctly. Aim your flame more toward the side than the top of the stacked wires. Remember to keep your flame moving with short movements, and don't move down the stacked wires until you have seen the silver shimmer of the metal reaching the fusing point.
3. If you still have difficulty, place the copper wire on top of the Argentium sterling silver. If you do this, make sure your charcoal block is flat; the silver will form to the contours of your block as it reaches fusing temperature.

Problem: Your wire is too springy and won't straighten.
Possible solutions:
1. It may need to be annealed.
2. Keep flipping the piece as you work your way down the wire.

Problem: While twisting, the billet twists unevenly.
Possible solutions:
1. You are only twisting and not pulling toward you as you twist. Reposition the billet in the vise so only the untwisted (or less twisted) area extends from the vise. Anneal the billet again if it resists.
2. Your billet is hardened more in one area than another. Anneal the billet, and secure it in the vise so only the less twisted area extends from the vise. Twist this section of the billet until it matches the remaining twisted sections. Anneal the billet and continue twisting it.

Problem: The billet snaps off while twisting it.
Possible solution:
1. The billet is overworked (work-hardened). Anneal it, and continue twisting.

NOTE: You don't need to file the twisted billet completely flat, just enough to bring out the pattern and help with the next step in squaring your billet.

Turn the billet 180° in the jaws of the vise, secure it, and file the raised sections. Turn it 90°, and repeat for the remaining two sides **[8]**. Finish each side by sanding B with a 400-grit sanding stick. Anneal, pickle, and rinse the billet.

Roll the billet through the square rollers in the rolling mill to further square it.

Forge the billet. Use the cross-peen side of a goldsmith's or forging hammer to stretch one end of the billet into a 12.5 x 12.5 mm (½ x ½ in.) piece **[9]**. The cross peen should be parallel to the billet to stretch it wider. Do not stretch it thinner than 18-gauge (1.0 mm).

NOTE: If you have difficulty striking your billet consistently with the cross-peen hammer, forge it with a slightly rounded-peen hammer to begin to flatten the billet. Once the billet is wide enough for you to strike consistently with the cross-peen hammer, continue to stretch it.

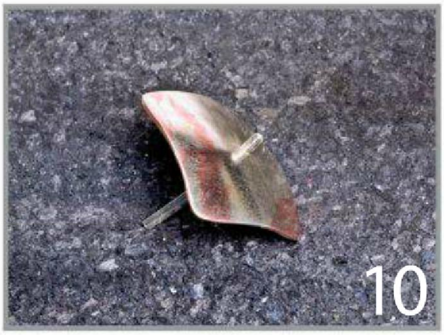
Planish the hammer marks out of the metal, or leave the hammer marks as a texture. Anneal, pickle, and rinse the metal.

Pearl ring

Saw out the mokume-gane shape. Use a jeweler's saw and a #1 or 1/0 blade to cut out a 12 x 12 mm (15⁄32 x 15⁄32-in.) piece of the forged mokume-gane sheet. File the edges smooth, and round the corners with a flat file. Sand the edges with a 400-grit sanding stick. Use a round dapping block and punch B ▣ to slightly dome the piece if desired. Sand the top with progressively finer grits of sandpaper until you reach your desired finish.

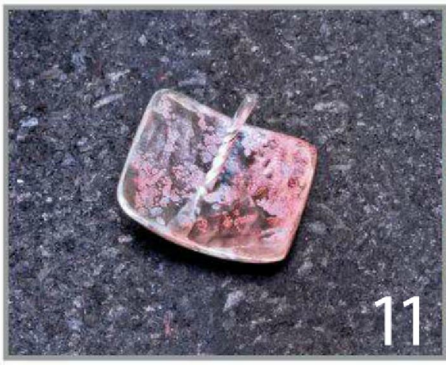
Make the pearl peg. Use a fine-tip permanent marker to make a mark where you want to place a pearl. Make a small dimple on the mark with a center punch. Drill a hole B ▣ with a #59 (1.04 mm/0.041-in.) drill bit. Sand any burs left from drilling with the sanding stick.

Cut a 5 mm (3⁄16-in.) piece of 20-gauge (0.8 mm) square sterling silver wire with wire cutters. Place the square wire in the hole, leaving a bit hanging out of the back side of the metal **[10]**.



Solder the pearl peg. Coat the entire mokume-gane shape and the sterling silver wire with a thin, even coat of flux.

Solder B the wire to the mokume-gane shape from the back with easy or medium silver solder. Let the assembly cool to black heat. Quench, pickle, rinse, and dry it.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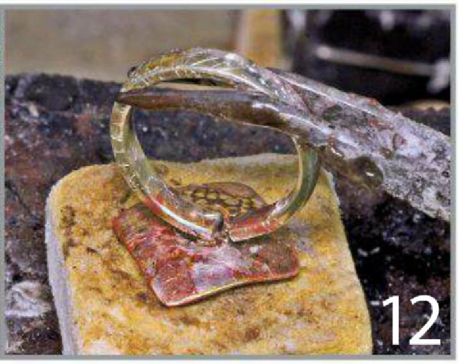
12

Process photos by Deborah Fehrenbach.

Twist the pearl peg. With flatnose pliers, grip the square wire. Pull it taut, and twist it one complete turn.

NOTE: The twisting will test your solder join and create ledges for the epoxy used to attach the pearl **[11]**. If the wire snaps off, file the mokume gane shape smooth, drill another hole in the same spot as the first hole, and resolder the pearl peg.

Refine the back of the mokume-gane shape. Snip off the wire extending from the back, finish the back of the assembly with progressively finer grits of sandpaper before soldering it to a ring shank; it is much easier to finish the back before soldering the piece to the shank.

Form a ring shank. Determine your ring size, and fabricate a ring band out of 12 gauge (2.1 mm) half-round sterling silver or Argentium sterling silver wire.

NOTE: To make the ring adjustable, I didn't solder the ring shank closed, and I only soldered half of it to the mokume-gane piece. You can make a closed-shank ring, or purchase a finished ring shank.

Solder the mokume-gane shape to the ring shank. Coat the mokume-gane shape and the ring shank with flux. Place the domed mokume-gane piece upside down on a soft firing surface. Drill (or press) a hole into the soldering surface to insert the peg into while soldering. This allows the domed mokume-gane piece to sit flush. Solder the mokume-gane shape to the ring shank with easy silver solder **[12]**. Let the ring cool to black heat, then quench, pickle, rinse, and dry it.

Finish the ring. Finish the surface of the ring as desired, and then apply Baldwin's patina to darken the copper and create contrast between the two types of metal.

NOTE: Baldwin's patina will darken the copper but won't affect the silver. Other common patinas, such as liver of sulfur, darken both copper and silver.

Check the fit of the pearl on the peg, and trim the peg until the pearl rests on the surface of the mokume-gane piece. Attach the pearl to the peg with epoxy.

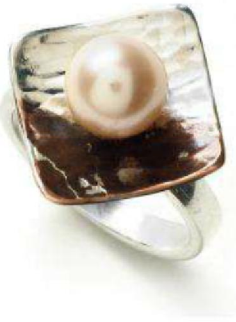

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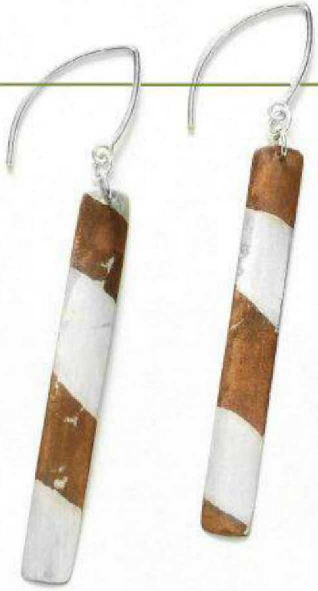
Photo by Adam Gibson.

Editor's note: Thanks to James Binnion, Bob Coogan, and Steve Midgett for their input.



bonus project: earrings

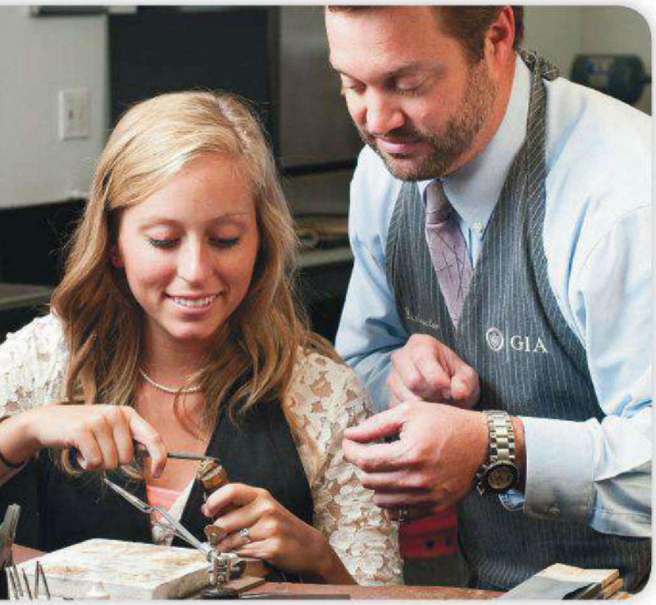
Saw two 45 x 6 mm (1¾ x 15⁄64-in.) pieces from your forged mokume-gane sheet. Use a goldsmith's hammer to texture each piece, if desired. File the edges and round the corners of each piece, then sand the edges with 400-grit sandpaper until they're smooth.

A

Form both pieces in a swage block with a goldsmith's hammer **[A]**. Using dividers, make a mark 1.5 mm (1⁄16 in.) from one end and 3 mm (1⁄8 in.) from each side on one piece. Repeat for the remaining earring. Make a dimple with a center punch at each mark.

B

Drill a hole at each mark with a #59 (1.04 mm/0.041-in.) drill bit **[B]**. Remove any burs left from sawing with 400-grit sandpaper. Finish the surface of the earrings as desired, and apply Baldwin's patina. Attach ear wires.



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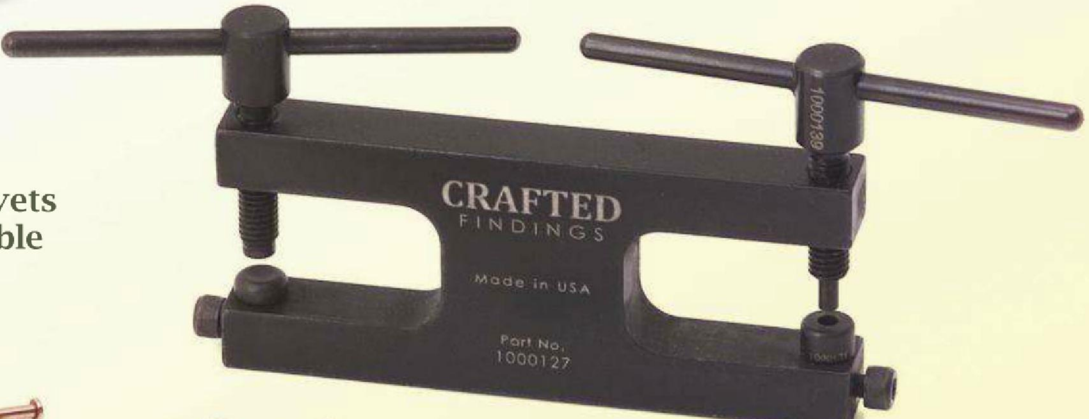

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VIDEOS

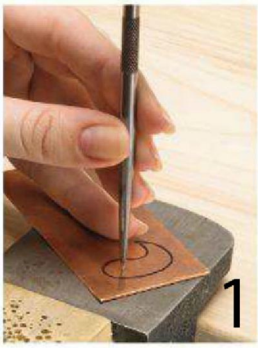
Look for this icon and find BONUS videos online at **www.artjewelrymag.com/videos.**

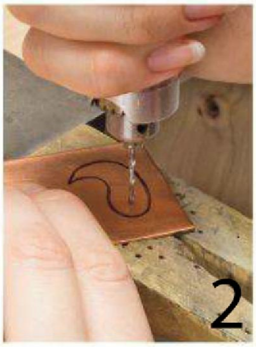
metalworking techniques

DRILLING/PIERCING

Place your metal on a steel bench block or anvil. Use a center punch and a mallet to create a shallow dimple where you want to drill **[1]**. Place the metal on a piece of wood and drill a hole, using the dimple as a guide **[2]**.

Remove one end of the saw blade from the saw frame. Slide the blade through the hole in the metal, then reinsert the blade into the frame, and tighten. Saw out the inside section of the metal. Release one end of the blade from the saw frame so you can remove the blade from the metal.





ONLINE EXTRA

To download a free "Metal Piercing Chart" that will help you select the best saw blade and drill bit for your project, visit **www.artjewelrymag.com/reference.**

SAWING

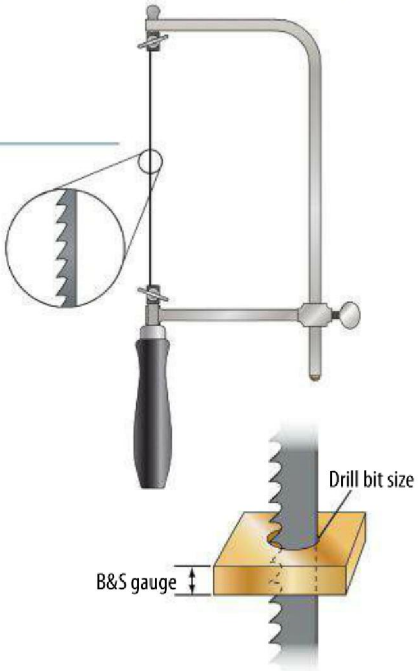
Select a saw blade that is the correct size for the gauge (thickness) of metal that you are going to cut.

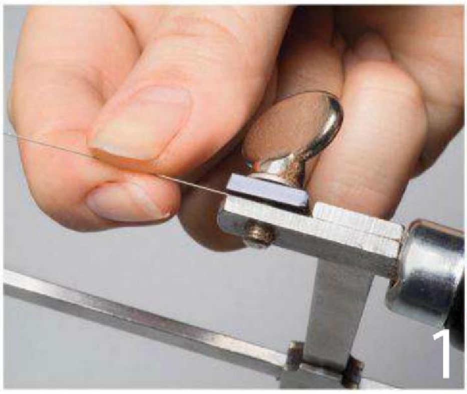
To thread a saw blade, insert the blade, with the teeth of the blade facing down and out, away from the frame, into the top wing nut of the saw frame, and tighten the wing nut. Brace the handle in the hollow of your shoulder, and apply pressure to the saw frame against your bench pin. Maintaining pressure, insert the bottom of the blade into the wing nut closest to the handle **[1]**, and tighten the wing nut **[2]**.

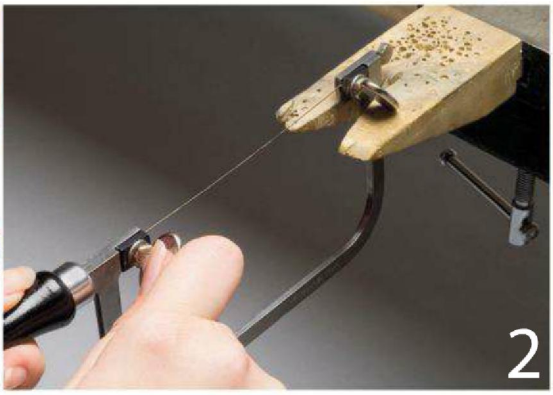
The blade should be taut and should make a high-pitched "ping" when you pluck it with your thumbnail. If you get a dull "twang" sound, reinstall your blade while putting pressure on the saw frame. Then, lubricate the blade with beeswax.

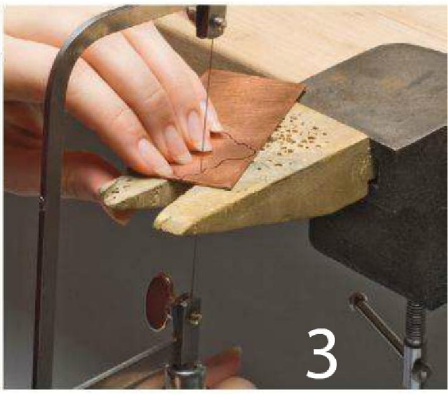
When sawing, sit in an erect posture with the top of your workbench at upper chest level. Slouching or having your work too low causes back and wrist strain and leads to broken blades.

To saw, grip the saw frame loosely in your hand. Use long, smooth motions, using as much of the blade as possible. The blade will work best when it's perpendicular to the metal **[3]**. Putting excessive pressure on the saw frame will make you work harder. Turn corners by sawing in place while slowly turning the metal; trying to turn the saw will break the blade.









SOLDERING

Clean the metal you plan to solder by sanding it with 400-grit sandpaper. Surfaces must be clean and in complete contact with each other for solder to flow; solder will not fill holes or gaps. Flux all the metal you plan to solder to prevent oxidation and to help solder flow. Heat the entire piece, not just the solder, keeping the torch moving in a circular motion.

If there is more than one solder join in a piece, solder the first one using hard solder, the second using medium solder, and the third using easy solder, as hard solder has the highest melting point and easy solder has the lowest. To keep the solder in previous joins from flowing when you heat the metal again, apply an anti-flux to those areas.

During soldering, the solder will flow toward where the heat is the greatest. If your solder is flowing in the wrong direction, adjust the direction of your flame.

Once the solder flows, quench the piece in water, and then place it in a pickle solution to remove oxidation and flux residue. Rinse the piece in clean water.

TUMBLE POLISHING

Place steel shot into the tumbler's barrel. Although you can use any shape of steel shot, a combination of shapes works best; the various shapes polish crevices and contours differently, ensuring an even polish.

Pour in water to cover the shot, then add a pinch of burnishing compound. Place your jewelry in the tumbler and seal the barrel. Turn on the tumbler, and let it run for 2–3 hours or more. Pour the contents of the tumbler into a sieve over a sink, and rinse. Remove your jewelry and dry it. Dry the shot before storing it.

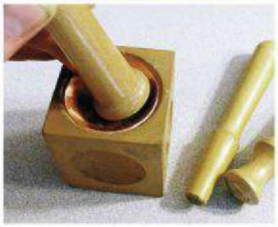
SANDING

To give your metal the desired finish, smooth the surface and/or edges by sanding with progressively finer grits of sandpaper. Begin with a coarse grit (220–400) and work up to a fine grit (600–1000). Rub each grit of sandpaper back and forth on the metal in one direction. When you switch to the next-finer grit, rub the sandpaper perpendicular to the marks from the previous grit until you can no longer see them.

USING A DAPPING BLOCK

Place a disk of metal over the dapping block depression it most closely matches in size. Choose a punch that is slightly smaller than the depression. Set the punch on the disk, and strike the punch with a chasing hammer or mallet until the metal sinks into the depression. Your first blow will make a shallow indentation; each successive blow will carry that indention inward toward the center of the disk.

When the metal conforms completely to the contour of the depression, move it to the next smaller depression in the block and switch to a smaller punch. Form the dome in stages until you have achieved the desired size and shape.



PATINATING WITH LIVER OF SULFUR

Polish your piece before patinating. (If you tumble-polish your piece after patinating, reserve the used shot for future patinated pieces, or scrub and rinse your shot and barrel thoroughly; the liver of sulfur residue can contaminate other pieces.) Oil and dirt on the piece can affect the patina, so use a degreasing soap to clean the metal before patinating.

Prepare a liver of sulfur solution according to the manufacturer's instructions. Hold your metal and dip it in the solution with tweezers for a few seconds, then rinse the metal in cool water to stop the chemical reaction. For a darker patina, continue to dip and rinse the metal. Use a brass brush with soapy water, a polishing cloth, or pumice powder to remove or modify the patina. By using different temperatures and amounts of water to make the liver of sulfur solution, you can create different colors of patina; experiment until you achieve the desired color.

If you don't want your entire piece to have a patina, use a soft-bristle brush to apply the liver of sulfur solution to select areas. Dip your brush into the solution, and dab it onto your piece. Follow the same instructions as above until you achieve the desired color.

ANNEALING

Annealing restores malleability to work-hardened metal. Place the metal on a soldering pad and heat it with a torch. When the metal has a dull, rose-colored glow, it is annealed. Quench the metal in water, and then soak it in pickle to remove oxides.

PICKLE

Pickle is a mildly acidic solution that cleans oxides from metal by stripping small amounts of copper from the metal. Pickle is generally sold in powdered form and is available from jewelry-supply companies. To make a pickle solution, mix the powder with water according to the manufacturer's instructions.

If steel (binding wire or tweezers) comes in contact with pickle, it can cause a chemical reaction that will copper-plate whatever metal is in your solution. To prevent this, use copper or plastic tongs to place metals in the solution.

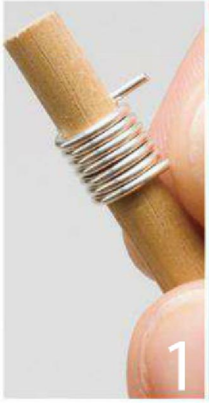
wireworking techniques

MAKING JUMP RINGS

Select a wooden dowel with a diameter that matches the inside diameter of the jump rings you want to make. Drill a hole through one end of the dowel. Insert the end of the wire into the hole to anchor it to the dowel. Wrap the wire around the dowel, keeping the coils tight against one another **[1]**.

Cut the wire at the end that anchors the spring. Slide the spring to the opposite end of the dowel. Secure the dowel against the V notch in your bench pin, and use a jeweler's saw with a 2/0 blade to cut a shallow, vertical slot at the end of the dowel to guide your blade as you cut the spring.

Hold the spring and dowel in your nondominant hand. Saw through the top of the spring, feeding the spring toward the slot in the dowel **[2]**. Be careful not to cut the jump rings in half.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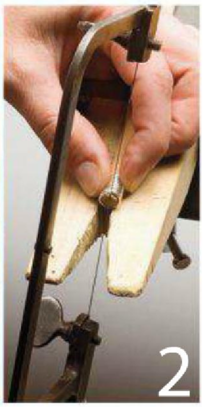
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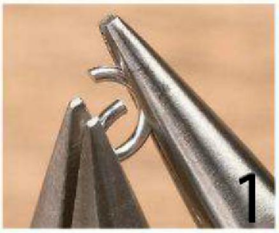
OPENING AND CLOSING A JUMP RING

Hold the jump ring with two pairs of chainnose pliers. To open the jump ring, bring one pair of pliers toward you and push the other pair away from you **[1]**. Reverse the steps to close the jump ring **[2]**.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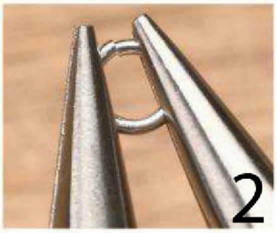
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metal clay technique

DRYING METAL CLAY

Metal clay can be air-dried or placed on a mug warmer to shorten the drying time. Alternatively, place the metal clay in a food dehydrator dedicated to nonfood use.

To check the moisture content of metal clay, place the piece on a sheet of glass. After 15 seconds, lift the clay from the glass. Any condensation on the glass indicates that the clay contains moisture. Do not fire the clay until it is completely dry.

safety basics

Metal clay

- Use your kiln in a well-ventilated area to sinter clay.
- All tools should be dedicated for nonfood use.
- Follow manufacturers' instructions for programming your kiln and sintering times and temperatures.
- Do not torch-fire metal clay pieces that have a core inclusion, such as cork or wood clay.
- Do not sinter or torch-fire metal clay pieces that are not completely dry, as they may explode.

Metals

- Wear eye protection at all times while working with metals, wire, and metalsmithing tools.
- Wear a non-flammable apron to protect your clothing.
- Tie back long hair.
- Work in a well-ventilated area at all times.
- Wear close-toed shoes.
- Do not wear clothing or jewelry that might get caught in machinery or catch fire.

Polymer clay

- Use a calibrated toaster oven to cure clay.
- Cure clay in a well-ventilated area.
- Your oven and all tools should be dedicated for nonfood use.
- Follow manufacturers' instructions for curing times and temperatures.
- Always wet-sand using wet/dry sandpaper.

All media

- Wear a dust mask while working with materials and tools that generate particulates.
- Read all Material Safety Data Sheets (MSDSs) before using a new material, and keep a copy of the MSDS for any material you use.
- Do not use tools or chemicals in ways that are contrary to the manufacturer's intended purpose.
- Wear protective gloves while handling caustic materials or chemicals.
- Keep a properly rated fire extinguisher and a source of clean water near your work station.
- Keep cutting tools sharp and all tools and equipment properly maintained.

toolboxes

Finishing

- Brass brush
- Copper tongs
- Files: hand, needle
- Flex shaft or buffing wheel, buffs, polishing compound
- Liver of sulfur or other patina, lidded glass container
- Microcrystalline wax
- Polishing cloth
- Polishing papers
- Sandpaper: various grits
- Scouring pad
- Steel burnisher
- Steel wool
- Tumbler, steel shot, burnishing compound
- Ultrasonic cleaner

Hammering

- Bench block or anvil
- Hammer: ball peen, chasing, cross peen, dead blow, utility
- Mallet: rawhide or plastic

Metal clay

- Acrylic or PVC roller
- Airtight storage container
- Brass brush
- Burnisher
- Clear, hard plastic sheet
- Craft knife
- Drinking straw
- Fine-tip paintbrush
- Flexible Teflon sheet
- Kiln, kiln shelf
- Mug warmer
- Needle files
- Needle tool
- Olive oil or natural hand balm
- Pin vise or holder, drill bits
- Plastic wrap
- Playing cards or thickness gauge
- Rubber block
- Shape cutters
- Smoothing tool
- Spatula or palette knife
- Syringe
- Texture sheets or molds
- Tissue blade: flexible, rigid, or wavy
- Tumbler, steel shot, burnishing compound
- Vermiculite, kiln-safe container
- Water: distilled
- Wet/dry sandpaper: various grits, or nail buff/emery board

Sawing/piercing

- Adhesive bandages
- Alligator tape (optional)
- Bench pin
- Center punch: manual or automatic
- Dividers
- Files: hand or needle
- Flex shaft, drill bits
- Jeweler's saw frame, saw blades
- Lubricant or beeswax
- Rubber cement or glue stick
- Safety glasses

Soldering

- Anti-flux
- Binding wire
- Borax (for borax solution)
- Copper tongs
- Fire-resistant surface: soldering pad, firebrick, or charcoal block
- Flux, flux brush
- Pickle pot with pickle
- Solder: hard, medium, easy
- Soldering pick
- Sparker: manual or automatic
- Third hand, insulated cross-locking tweezers
- Torch, various tips
- Sandpaper: various grits
- Tumbler, steel shot, burnishing compound

Wirework

- Bench block or anvil
- Cutters: side, end, or flush
- Hammers: chasing, ball peen, cross peen
- Mallet: rawhide or plastic
- Mandrels or dowels
- Needle files
- Pliers: chainnose, flatnose, roundnose, parallel, nylon jaw
- Polishing cloth
- Sandpaper: various grits
- Tumbler, steel shot, burnishing compound

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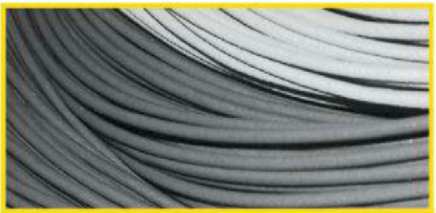

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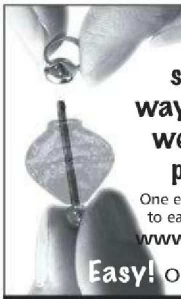

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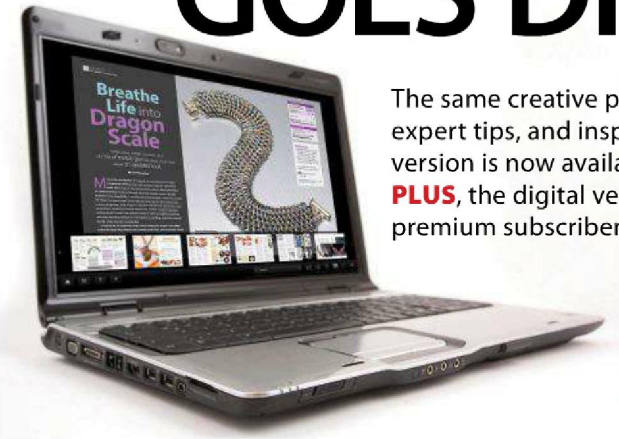

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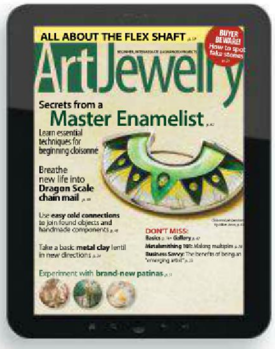

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- Chris Nelson, www.urban-armour.com
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- Liz Hall, www.lizardsjewelry.com
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- Alex Lewandowski, www.alexmetalarts.com
- Renee L. Ford, www.panicmamajewelry.com
- Hiromi Suter, www.hiromisuter.com

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- Knifemaking supplies (Jantz Supply, 580.369.2316, www.knifemaking.com; Texas Knifemakers' Supply, 888.461.8632, www.texasknife.com; Sheffield Knifemakers Supply, 800.874.7007, www.sheffieldsupply.com)
- Wood (local hardware stores)

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- Low-carbon, black annealed-steel wire, brass wire, screws, and Atlas Nitrile Tough gloves (local hardware stores)
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- Metal clay, tools (Whole Lotta Whimsy, www.wholelottawhimsy.com; Rio Grande, *below*)

TAKE A DIFFERENT APPROACH TO MOKUME GANE

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- Argentium sterling silver, sterling silver wire, easy solder, flux (Rio Grande, *below* or Stuller, www.stuller.com)
- Copper wire, Baldwin's Patina, Forging hammer, jeweler's saw (Rio Grande, *below*)
- Bench block, rolling mill, files (Otto Frei, www.ottofrei.com)

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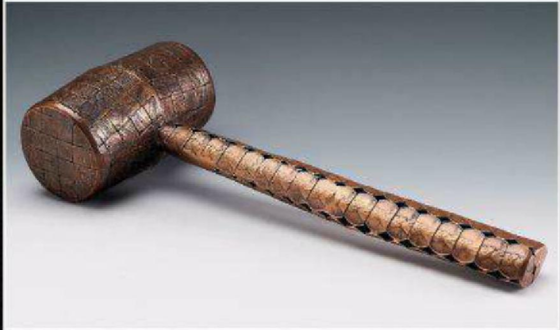
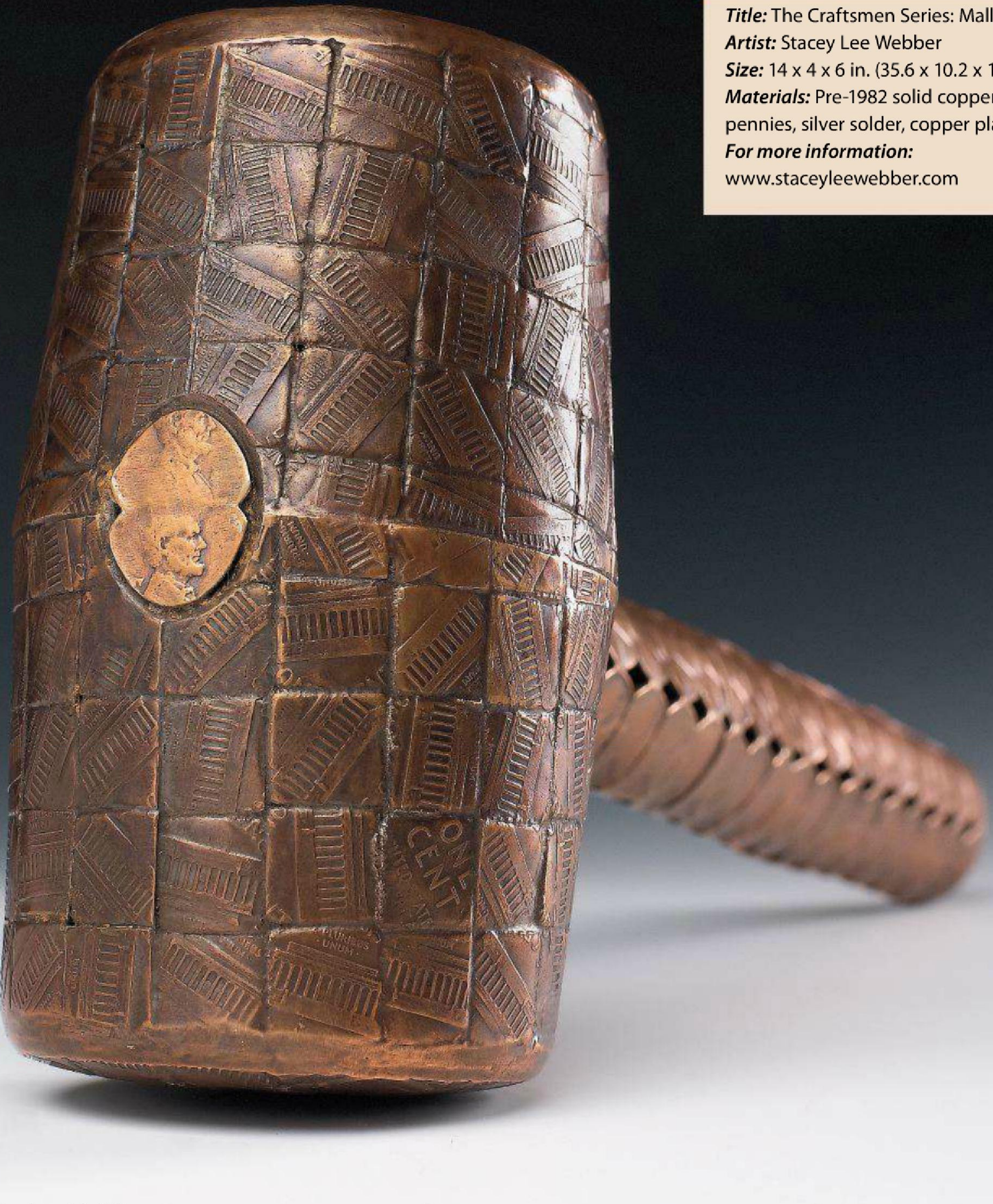
Money vs. Labor

While in graduate school, Stacey Lee Webber explored the value of the labor involved in making art, architechture, and jewelry by hand. She started to literally put labor into money and realized she could create sheets of copper out of old pennies. Drawing on her memories of hard-working family members, Webber chose to depict the stuggles of those blue-collar workers by forming her penny sheets into a working man's everyday hand tools. —*Theresa D. Abelew*



AT A GLANCE

Title: The Craftsmen Series: Mallet
Artist: Stacey Lee Webber
Size: 14 x 4 x 6 in. (35.6 x 10.2 x 15.2 cm)
Materials: Pre-1982 solid copper pennies, silver solder, copper plating
For more information:
www.staceyleewebber.com



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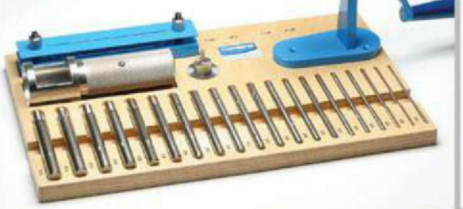

Ⓖ $\$169^{50}$

Ⓐ **ECONOMY ROLLING MILL** [Item 190-891] Surprisingly affordable, this mill is equipped with two 43 mm dia. flat, hardened steel rolls and two wire rolls, all 76 mm wide. Wire rolls have grooves from .75 to 4.3 mm wide. Has 4:1 gear reduction for easier operation. Includes a 1 year warranty. Ⓑ **DAPPING TOOL SET** [Item 190-242] Includes 49mm (1 $^{7}/_{8}$") dapping block and 24 punches, 2.3mm to 25mm in diameter. The depressions on the Die range in diameter from 3.8mm to 40mm. Provided with wood stand. Ⓒ **ECONOMY FLEXSHAFT MACHINE** [Item 236-971] With its powerful $^{1}/_{8}$ HP motor and spring-reinforced sheath, our Economy Flexshaft is an outstanding value. The 1" diameter No. 30-style handpiece is equipped with a Jacobs-style chuck that accepts any bur, drill bit, or rotary tool with a shank up to $^{5}/_{32}$" diameter. Operates at speeds up to 22,000 RPM, regulated by a carbon resistance foot rheostat. Shaft connection accepts any American-style (QD connection) handpiece. Furnished with fitted carrying case. Ⓓ **JEWELER'S WORKBENCH** (UPS Shippable) [Item 110-234] Hand-crafted from solid woods for durability and strength. Railing on 3 sides. Equipped with metal-lined pull-out tray, pull-out tool shelf with 2 levels, 3 storage drawers, bench pin, and 2 arm rests. 39" wide x 19.5" deep x 39" high. UPS Shippable. Ⓔ **NECKLACE MANDREL** [Items 320-643] Hammer, shape, and form necklaces on this chrome plated, cast iron mandrel. 7 $^{1}/_{2}$" wide by 7 $^{1}/_{4}$" deep by 4 $^{3}/_{4}$" high. Ⓕ **JUMP RING MAKER** [Item 400-125] Produce jump rings quickly and easily with this time-saving device. Coil your wire around one of the twenty mandrels (diameters range from 2.5 to 12 mm) using the hand-winder. Once the coil is formed, place it in the adjustable coil holder and saw through it using the included rotary saw and handpiece guide. It's that easy! *Flexshaft machine with 1" diameter (No. 30 style) handpiece required (not included)* Ⓖ **SOLDERING KITS** [Items 456-140 & 456-141] Include all the essentials for soldering with inexpensive, easy-to-use torches. Choose between a kit that includes a hand-held butane torch (shown) and one that includes a propane torch. Oxygen tanks not required. Ⓗ **GUILLOTINE SHEAR** [Item 410-944] For cutting stock, neatly and exactly, up to 4" wide. Designed to cut mild nonferrous metals up to 2.4mm (10gauge) and mild steel up to 1.6mm thick (14 gauge). Blades are precision ground and hardened high carbon steel.

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